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ABSTRACT

This collection of papers examines research methods in geographical education in nine countries. "Research Methods in the History of Geographical Education" (William Marsden, the United Kingdom) examines the methods used and some of the research undertaken in the history of geographical education. "Research Methods in Investigating Children's and Adolescents' Perceptions of their Environment" (Brian Spicer, Australia) lists sources for research and some of the issues involved. "The Perception of Hazards in Geographical Education: Research Methods" (Giorgio Valussi, Italy) concerns finding out how pupils perceived hazards. "Methods of Researching the Use of Visual Aids in the Teaching of Geography" (Agustin Hernando, Spain) concentrates on classifying the kinds of studies conducted to evaluate visual aids in geography. "Research Methods in Evaluating the Use of Media in the Teaching of Geography" (Hartwig Haubrich, West Germany) is concerned with experimental design for teaching aids. "Broadening Geographical Education" (Henriette Verduin-Muller, The Netherlands) deals with information theory. "Three Brazilian Cognitive Studies on Geographical Education" (Livia Oliveira) deals with Piagetian concepts in geographical education. "Research in Computer Assisted Learning" (Ashley Kent, United Kingdom) reviews research methods used in analyzing and evaluating the use of computer-assisted learning in geography. "Research into the Problems of Methods of Geography Teaching in the U.S.S.R." (Lydia Panchesnikova) examines research methods used in that country. "Action-Research Methods in Geographical Education: the Experience of France" (Lucille Marbeau) summarizes action-research experiences with student teachers. "Research Methods in Geographical Education in Japan" (Ryutaro Asakura) gives an overview of Japanese research methods. (IS)

RESEARCH AND RESEARCH METHODS
IN
GEOGRAPHICAL EDUCATION

edited by

Norman J. Graves

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Introduction

It has been the practice during recent I.G.U. congresses to present some of the work of the Commission on Geographical Education in the form of booklets on particular themes. In 1976 the two volumes presented were International Research in Geographical Education (edited by Joseph Stoltman) and Abstracts and Papers for the Commission on Geography in Education Meeting in Leningrad (edited by Norman Graves). In 1980, the booklets were Historical Perspectives on Geographical Education (edited by William Marsden) and Geographical Education: Curriculum Problems in Certain European Countries with Special Reference to the 16-19 Age Group (edited by Norman Graves). For the I.G.U. congress in Paris in 1984 and for the Commission on Geographical Education Meeting in Freiburg, Joseph Stoltman, Chairman of the Commission has asked me to edit a collection of Papers on the theme of Research Methods in Geographical Education, which I am happy to present here.

The first paper examines the methods used and some of the research undertaken in the history of geographical education. This is undertaken by William Marsden who has experience of both geographical education and historical research. It is of course, based on research done in the United Kingdom. Brian Spicer does a thorough job of listing the sources for research into children's and adolescents' perceptions of their environment and discusses some of the issues involved. The third paper by Giorgio Valussi and his colleagues is a piece of pioneering research in the Friuli region of Italy concerned to find out how pupils perceived hazards, particularly earthquake hazards in an area subjected to such phenomena. It is significant that little was known of the world context of such hazards or of explanatory theories.

Turning to the topic of research into the use of teaching aids in geography, Agustin Hernando concentrates on a classification of the kinds of studies undertaken to evaluate visual aids in geographical education, whilst Hartwig Haubrich is concerned with experimental design for a wide range of teaching aids. The former's sources as essentially British, whilst the latter's are German. In the sixth paper Henriette Verduin-Muller returns to her main research themes, name the use of information theory in the communication of geogrpahical information to a wide public. This is based on work carried out in the Netherlands and in a wide variety of other national contexts. There follows a paper from Livia Oliveira and her colleagues which extends her Piagetian studies of Brazilian children's understanding of geographical ideas namely projective spatial relations in map reading, topological relationships and the concepts of grids, direction and distance. Ashley Kent reviews the research methods used in analysing and evaluating the use of Computer Assisted Learning in geography based on work carried out in the United Kingdom. The last three papers are reviews of the kind of research undertaken in three very different countries. Lydia Panchesnikova examines the research methods used in the U.S.S.R. with special reference to the efficacy of particular teaching styles and teaching strategies. Lucille Marbeau summarizes some action-research in which she has been involved in France with practising teachers. Lastly Ryutaro Asakura gives an overview of the kind of research methods used in Japan in this field.

I would like to thank colleagues for undertaking the writing of these papers and to hope that my editing (and in one case translation) has not distorted the message they wished to convey.

Norman J. Graves
April 1984

RESEARCH METHODS IN THE HISTORY OF GEOGRAPHICAL EDUCATION

W. E. Marsden

In a previous contribution to an IGU Publication on 'Historical Perspectives in Geographical Education' (Marsden, 1980), various justifications for the use of a historical frame of reference in the study of geographical education were presented. Among these, is the potential of the past as a store of knowledge and experience and as a cultural context, hopefully providing a basis for refining judgements on current situations. In addition, it was argued that the record of the subject's development in education is a topic of some fascination in its own right.

In investigating this past, an authentic historical methodology is required. Among the hallmarks of the historian's craft are a respect for evidence, a concern for comprehensive collection and collation of data, and a grasp of vividly recreating the inter-connections of events and the inter-relationships of actors of past times. The historian in a sense is a conservationist, concerned for comprehensive, idiomatic and empathetic resource use. The capacity to grasp the complexity of detail, to place action in context and to become attuned to the generally slow pace of 'genuine' change, would seem likely to dampen polarised thinking about current issues, and promote a more humble and constructively sceptical counterpoint to the over-enthusiastic espousal of new trends and the erstwhile propensity of some incautious social scientists (and, dare one say, curriculum developers) to regard current ideas as pristine, emerging, as it were, from a vacuum. While historians equally can be over-cautious, and lapse into reactionary and even cynical attitudes towards change, they have built-in criteria against which to appraise 'new' developments. Thus official voices have tended to write off the impact on curriculum change of bodies such as the Schools Council by applying unrealistic tests in terms of pace of change, judging success not in relation to gradual improvement on a previous model. but rather demanding a rapid and politically demonstrable spin-off.

The previous article also identified potentially fruitful research fields in the history of geographical education. These included 'Pressure Groups for Geographical Education'; 'The Influence of University Geographers and Geographical Educationists'; 'The Development of the Geographical Textbook and other Geographical Materials'; and 'The Development of Geographical Curriculum and Pedagogy'. This paper will concern itself with the latter, as a means of illustrating some of the research problems which crop up in the study of the history of geographical education.

In striving to recreate the living world of geographical education in the late nineteenth and the early years of this century, it is helpful to think of it as in many ways not dissimilar to that of today. It is certainly not good research prematurely to stereotype it as a kind of primitive 'capes and bays-dominated' stage in the evolution towards a contempoary apogee. The forces operating were analogous to those current today. There were, for example, the tensions between those stressing the need to promote a child-centred pedagogy, those arguing for a limited and utilitarian approach monitored by a rigid examinations system, and those seeking to legitimate and raise the status of the subject in academic terms.

The tensions were articulated in an extensive literature, on which the historian of geographical education can draw. The illustrative material below is deliberately chosen to testify to this range of sources. Thus among the contemporary sources were general methodological texts on curriculum and pedagogy, such as those of Wyse (1836), Fearon (1876), Bain (1878), Combe, (in Jolly 1879), Symons (1879), Fitch (1884), Laurie (1888), Barnett (1897) and Welton (1896). These often contained sections on individual subjects, such as Welpton's geographical contribution to Welton (pp 278-354). There were in addition methodological texts, of varying scope, specific to the subject, including those of Meiklejohn (1869), William Hughes (1870) (see Vaughan (1980) pp. 66-79), and Archibald Geikie (1887) (see Marsden 1979(a)), pp 39-52, and (1980, pp. 54-65), whose *The Teaching of Geography* was described by Robert Quick, in a well known text on educational reformers (1902), as a book he had read 'with great delight' (p.544), and by Herbertson as 'full of wise and admirable suggestions' (1896, p.582).

Then there were articles on geography teaching in journals such as the *School Guardian* (an organ of voluntaryist opinion), and the *School Board Chronicle*, while articles on specific subject teaching also appeared in more academic journals, as for example, the *Educational Review* and the *Journal of Experimental Pedagogy* and, in the United States, the *School Review*, to which W. M. Davis contributed papers on geographical education (see below).

In the late nineteenth and early twentieth centuries, articles on geographical education burgeoned in journals devoted to the subject itself, such as the *Geographical Journal*, the *Journal of the Manchester Geographical Society*, and the *Scottish Geographical Magazine*, and then to its teaching such as *The Geographical Teacher* (later *Geography)* in Britain and *The Journal of School Geography* (later *The Journal of Geography*) in the U.S.A.

Some of these were the journals of societies with a vested interest in promoting geographical education. Of these, the Royal Geographical Society was outstanding, and no sources are more important than its seminal Keltie Report (1886), and its rich archives (Kelly, 1975). The role of the Geographical Association was also critical and its origins are recounted in a commemorative issue of Geography (Fleure, 1953), and in Jay's study of Douglas Freshfield (1980), pp 43-51).

Among the groups who acquired decided views as to how geography should be taught was Her Majesty's Inspectorate, followed by the central agencies, the Education Department in Whitehall and the Science and Art Department (for physical geography) in South Kensington, and later the Board of Education. The views of the inspectors were recorded in the annual Minutes and Reports of the Committee of Council on Education, which communicated judgements and advice about geography teaching in elementary schools. Guidelines for such teaching were laid down in the Codes, also reported annually in the above Reports. There were also, in this century, the Circulars and 'Suggestions to Teachers' produced by the Board of Education, recommending particular methods of teaching geography and local studies. More scattered, but often useful, insights into geography teaching can be found in school records (such as details of 'object lessons' in geography, in school log books), in autobiographies, whether of pupils or teachers (e.g. Nathan, 1946) and in school histories (e.g. Mumford 1919).

Progressive Education Thinking

Local Studies

'Teaching, like charity, begins at home' (Laurie, 1888, p.96)

It is difficult to exaggerate how familiar the proponents of geography teaching in the late nineteenth century were with the tenets of progressive educational thinking, and how repeatedly these tenets were espoused in the literature. It is hard indeed to understand why the ideas were so little applied, not only in the late nineteenth, but also throughout the first half of the twentieth century. Geography manifestly had a crucial progressive role to play in its ability to focus on the world of the child: the world of the senses. A concentric teaching strategy was advocated in which the child was moved from the familiar to the unfamiliar, the concrete to the abstract, the near to the far. The critical early environmental influence was the mother; then the home; then the school. In school, attention was to be paid to the classroom, then the area surrounding the school, followed by class excursions further afield, supported by local maps. For more distant environments, surrogates of reality could be found, such as hardware models, simulated landscapes and pictures, whether in books or as lantern slides, prints or drawings, drawings, and first-hand descriptions from missionaries and other heroic travellers.

The espousal of these methods was accompanied by a savage demolition of geography 'as it was taught'. Thus Meiklejohn's contribution was categorically entitled On the Best and Worst Methods of Teaching Geography (1869), which in retrospect carries more conviction in its negative rather than positive recommendations. Like Meiklejohn's text, William Hughes's Geography: What it is and How to Teach it (1870) castigated the repetitive learning of geographical names, but offered a somewhat academic replacement in its stead. However, Hughes also advocated the infusion of reality into the subject, through object lessons, country walks, occasional excursions,

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seaside, museum and botanical visits (p.19).

More cogent and sophisticated were the views of two great natural scientists, T. H. Huxley (1877, p. vii and p. 1ff) and Archibald Geikie, both particularly concerned with the advancement of physical geography, and both relatively successful in achieving a synthesis between progressive educational thinking and academic respectability. Thus Geikie saw nature as an inspiration both to the elementary pupil and the maturing student.

> 'In dealing with the young we should try to feel ourselves young again, to see things as they are seen by young eyes, to realise the difficulties that lie in the way of children's appreciation of the world around them.....' (1887, p.7; see also 1905, pp. 298-9)

Among academic geographers, Scott Keltie, speaking to the Aberdeen meeting of the British Association in 1885, stressed the importance of local studies, or heimatskunde (see Watts, 1969), for the young pupil, as a prelude to moving outwards to the home region, the county, the country and then to Europe and other continents (S.G.M. (1885), p.501. See also Keltie Report (1886), pp. 116-121). Herbertson distinguished home lore (heimatskunde) as different from, but subsuming, home geography, and approved both as necessary precursors to world study. Children must first understand their home district, helped by local excursions in school hours, such studies forming 'the binding courses and the coping-stones of the geographical edifice.' (S.G.M. (1896), pp. 414-421).

Keltie's paper drew attention to an earlier influential discussion of the value of local study, by H.M.I. Moseley, who condemned the chasms opened up in the child's mind by the compulsion 'to expatiate over half the globe', and stressed that the first step in the child's education was 'to teach him to observe' (M.C.C.E., 1845, vol. 1, pp. 234-5). Later inspectors, such as Steele on the Preston district (R.C.C.E., 1876-7,

p. 577), Blakiston on Leicestershire (R.C.C.E., 1878-9, p. 475), and Brewer on the Blackburn District (R.C.C.E., 1878-9, p.512) all extolled the value of local field work in bringing the subject to life. 'The best book of geography is the face of the earth itself', wrote Brewer.

Strong reinforcement of such ideas came from writers on pedagogy. Wyse insisted that the rudiments of geography were 'already learned on the daily walk', before schooling started (p.140). Bain, fifty years later, concurred:

> 'It is from some commanding eminence that a pupil should receive first impressions of Geography, if the subject is to be taught according to the prevailing wish for concrete realisation' (p.273)

Fitch was equally clear that the earliest ideas should be derived from home surroundings, but urged that these ideas 'be properly localised, and shewn in relation to the size and form of the world itself, by means of moving out to maps of smaller scale'. (p.347. Professor Gonner of University College, Liverpool, also supported the heimatskunde approach and similarly urged the making of maps of the locality, then moving to smaller scale map study, fitting the student finally to understanding the atlas (in Barnett 1897, pp. 203-4).

No writer was more persuasive about the value of reality in geography teaching than George Combe, who advocated both the field excursions which he had observed in Germany, and also lessons in the home, as he had witnessed with an influential family in Boston, Mass., where the father had instructed his sons in a way 'at once simple, agreeable and efficaceous'.

> 'In the evening after tea, when the family are enjoying the quiet comfort of the winter fireside, he desires one of his sons to read from the daily newspaper the list of ships which have arrived in Boston; it specifies the places from which they have come, and the nature of the cargo. He then asks one to point out the place on the map, and to tell the latitude and longitude; another is requested to assign a reason why it brings that particular cargo from that port. This leads to an explanation of the climate, soil and natural productions of that part of the globe....' (in Jolly, 1879, pp. 452-3)

A few accounts are available of the putting into practice of home geography and field work methods. Thus an article by Wise (1948) draws attention to the work of the Hill family in pioneering progressive methods of geography teaching at Hill Top and Hazelwood schools in the 1815-25 period. Among the techniques used were the making of ground plans of the class room and the interpretation of local maps (p.20). Similarly at Bruce Castle School in Tottenham:

> 'As introductory to geography, we first take the topography of the place at which the instruction is given, together with that of the surrounding neighbourhood. We begin with that of the very room in which the class is taught .... the pupil is gradually rendered familiar with the conception of greater and greater magnitudes and distances, and with the habits of nations less and les intimately connected with our own' (Anon, 1837 p. 16)

Such isolated early initiatives anticipated the considerable increase in the practice of field work in the School Board period. These ventures were often more wide-ranging in their scope. Thus the *School Board Chronicle* in 1889 recounted an ambitious programme of school journeys supported by the Barnsley School Board, which set the school parties to trace the River Don from source to mouth, starting in the 'high spongy moors' about Holme Moss, and moving down through Penistone, Sheffield and Doncaster to Goole, drawing attention to features of geography, natural history and history *en route* (Nov. 4th, p. 479). Equally ambitious was the work of Lucy Reynolds, of Stranmongate School in Kendal, who undertook three-day journeys with her girls into Furness and Lakeland, engaging in geography and map study, literary associations, history and architecture (Furness Abbey), the experience establishing 'a more vital sense of connection' between the hours spent at school desks and the world outside (1906, pp. 152-9).

Even the Education Department, then the Board of Education, generally stereo-typed as inhibitors of progress, came to accept the desirability of home geography. The Elementary Code of 1892, for example, presented an alternative scheme of geography which concentrated in the first standard on the plan of the school and playground and meaning and use of a map, on home geography in Standard II, England and Wales in Standard III, Scotland, Ireland, Canada and U.S.A in Standard IV, and on other parts of the world, with special reference to the colonies, thereafter (Education Department, 1892).

In April 1900, Board of Education Circular 435 on 'The Curriculum of the Rural School' emphasised the importance of making education in the village 'more consonant with the environment of the scholars than is now usually the case, through observation of the processes of nature, object lessons connected with local surroundings, simple and practical experiments, local mapping, school walks and their follow-up in the classroom' (pp. 1-4). The Board's more general 'Suggestions for the Consideration of Teachers' (1905) included advice on geography both for town and country schools and similarly argued the critical importance of local study for younger scholars (pp. 54-8).

The climate of opinion in the United States was very similar. As early as 1826, Emma Willard's frontispiece in Geography for Beginners showed a country store 'exhibiting the Productions of various countries', while the opening lesson began 'on mother's knee' (in Briggham and Dodge, 1932, p.10). Cubberley described the application of Pestalozzian ideas at Oswego Normal College, New York State, in the 1860s, involving the concentric approaches hitherto described (1919, p.301).

But the most persuasive and sophisticated advocate of field work was the great geomorphologist, William Morris Davis, who may be seen to have occupied a niche similar to those of T. H. Huxley and Geikie in Britain.

> 'If there is one thing more important that another in the teaching of geography.... it is that the facts of the subject be made vivid and real. Every means of the teacher's art should be employed to secure this end' (1893, p. 115)

As with Huxley and Geikie, Davis saw field work not as a matter of mere observation, but as extending the mind:

> 'It should be clearly understood that work of this kind is not limited merely to matters of observation and record. These are truly the first steps, but they must be followed by abundant thinking; indeed, the soul of the work is gained only when the thinking that is inspired by the observations is logical, searching, critical.' (1902, p.239)

By these means, an essentially scientific outlook would be generated. *The Journal of School Geography* (Perry 1899; Kelton 1900; Dodge 1900; and Balliet 1900, pp.44-5) and then *The Journal of Geography* (including Davis's article above) emphasised the value of home geography and field work, in some cases drawing attention to its pedagogical justification. Thus Balliet argued the object of the work was to develop 'apperceiving concepts' by direct observation, which could later be applied to areas 'beyond the range of his observation' (p. 44), while Dodge referred to the 'pedagogical order' of moving from the 'unrelated and little known', along 'the lines of least resistance' to the 'casually related known or unknown' (p. 123).

The pressures for field work were by no means solely and disinterestedly progressive, however. The latter part of the nineteenth century witnessed growing anxiety about the subverting influence, physically, psychologically and morally, particularly on young people, of the urban environment. Under the influence of social Darwinism, eugenicists and others inflamed fears of racial decay: of urbankind in a state of cumulative deterioration (see for example, Reeder, 1977, pp. 75-94, and Marsden (forthcoming). Behind the outward problems of urban life lay an 'invisible spirit, which makes for neuroticism, decadence, moral drift, instability and national decay' (Paton, 1909, p. 546).

Not for the first time, education was asked to provide a cure. One palliative was to introduce the urban child to country ways of life. Here geography could assist in awakening a consciousness of a lost rural content, 'to counteract the misfortune of living in a large town' (Laurie, 1888, note on pp. 96-7). The town was for long seen as an inappropriate place in which to conduct field work. In the first issue of The Geographical Teacher (1901), Joan Reynolds made the point that as Cardiff, in which her school was located, was a large town, money was needed for tram or bus fare to get children into the country (p. 33).

Geikie, whilst seeing the most advantageously conducted field work as that undertaken in the countryside, nonetheless argued that 'the skilful teacher' would find topics of interest for every walk 'even in a wilderness of streets and houses' and 'the most crowded thoroughfares' (1887, p. 17). Orford thought that field work could best be fulfilled in his Southwark environment by the children doing it themselves as home lessons, after demonstration in the classroom. Only a river trip on the Thames was run as a conducted excursion. (1906, pp. 264-6).

The most substantial text on field work in urban areas was Penstone's Town Study (1910), sub-titled, 'Suggestions for a Course of Lessons Preliminary to the Study of Civics'. Not for the first time was home-study seen as integrational, and not the narrow domain of geography.

Penstone in fact was more than a little ambivalent:

> 'We do not forget what has often been pointed out - that the sights and sounds of city life may have very little educative value in themselves. This is especially true with regard not only to the slum, but even more to the mean and montonous suburbs which form such large areas in London and other great cities (p.2).

But even the study of 'mean streets' was important for the indirect benefit of making apparent to the children the possibility of improvement and, prophetically, incitement of a 'divine discontent'. There was, of course, 'even in a dreary inner suburb', much 'that is interesting and significant to the seeing eye'. But it required skilful interpretation on the part of the teacher to make the child aware of the 'romance' which lay behind 'the obvious and commonplace' (p.3). More fundamentally, by learning to know and love what was most familiar to him or her, local pride was fostered, which, in turn, could beget the desired love of country (pp. 9-11).

Ordnance Survey Maps

> '...... there is nothing which so keenly enlivens and excites as maps. They are the salt of schools..' (Symons, pp. 100-1).

The potential of Ordnance Survey maps as reinforcers of locally-based field work was appreciated relatively early. Thus H.M.I. Moseley noted that such maps were 'admirably adapted' to studying the topography of the parish (M.C.C.E. 1845, p. 238), while H.M.I. Fletcher suggested local Ordnance Survey maps should be 'part of the school furniture'. The local inspector might help by cutting these into pieces, supplying the appropriate portion to each school contained on the map of his district, and encouraging the school to make an enlarged version of its particular portion, for us in the instruction of the younger pupils, (MC.C.E. 1846, p. 101). Turnbull, in writing on the Manchester district (R.C.C.E. 1873, p. 117), suggested the fourth standard could cope with the 1" map, while Graves, on the Huddersfield district (R.C.C.E. 1881-2, p. 308) argued that study of the local O.S. map should follow mastery of the plan of the schoolroom and its surroundings.

The Ordnance Survey itself became keen to promote such use. Thus Colonel Wilson of the Ordnance Survey office wrote to the Royal Geographical Society to point to the educational value of O.S. maps of various scales. (R.G.S. Archives, 4th August, 1884). In turn, the Royal Geographical Society wrote to the Education Department, advocating linkage of O.S. map instruction, and especially the 6" map of the school area, to the Schedule of the Code of Regulations which covered 'The Meaning and Use of a Map' (R.G.C. Archives 6th April, 1888).

Similarly, Herbertson (1896) approved strongly the use of different scales starting with the largest possible scale of 1:10 maps of the classroom, then moving out to the 1:2500, 1:10000; and 1:63 360 Ordnance Survey maps, with the school in the centre of each (p. 523 and 525). In the first volume of The Geographical Teacher, which included as an inset the 1:63 360 hachured sheet of the Oxford area, a paper by Archibald Geikie argued that one of the first efforts of the geography teaching should be to train the faculty of pupils to draw from maps, starting with the minutely detailed town maps on the 1:500 and 1:1056 scales, then moving on to the smaller scales instanced by Herbertson. He pointed out that the 1" contoured and hachured maps could be used for comparative purposes in the study of physical geography, and could be linked also with the 1" geological survey (1901, pp. 61-5).

In the United States, a Massachusetts teacher, Emerson, argued in the *Journal of School Geography* that the first map the teacher should use was an adaptation of the local map of the U.S. geological survey (1899, p.288). W. M. Davis shared the view of English counterparts such as Geikie and Herbertson that official maps of different scales were vital, and produced a book, *Governmental Maps for Use in Schools* (1894).

Models and Appliances

Another means of realistically conceptualising features of landscape within the classroom was through the use of hardware models. These could include idealised, simulated landscapes. The 'hitherto undescribed country', as envisaged in a model-building exercise by Frend as early as 1832 (pp. 47-48), was a powerful tool in an era excited by unknown lands. A similar idea was also exemplified by Hindshaw in a paper to the Manchester Geographical Society in 1886 (pp. 234-5).

More usually, the models were suggested as a means of building outwards from the local area, starting with the models, then going on to maps (Wyse, 1836, p. 141). H.M.I. Markheim, in a report on the Northallerton district (*R.C.C.E*. 1878-9), wrote glowingly of what seems to have been a conspicuosly good example of model use, at a Whitby school:

> 'The subject is the geography of Yorkshire, and a sand map of the county, with all the important physical features, has been carefully modelled on a terraced adjoining the schoolroom. The sand has been brought by the children from the beach, and has been moulded by them, with the assistance of their teachers into mountains, hills, valleys and rivers. The proportions are observed with wonderful accuracy; nothing could be neater or more finished in its way than the coastline ornamented with diminutive lighthouses at the

> well-known ports; the towns are represented by little square blocks of chalk of different sizes, according to their population and importance.... evertything speaks to the eye ....' (p.643)

During the period of its most active espousal of geography in schools and universities, the Royal Geographical Society made it part of its function to arrange exhibitions of various aids to teaching, including models and appliances. Thus in November 1885 Keltie reported to the Society's 'Geographical Report Committee' that the exhibition of appliances on Geographical Education to be shown at Great Marlborough Street in December of that year was ready (R.G.S. Archives, 19/11/1885). The Committee then agreed the exhibition be lent to the Manchester Geographical Society, followed by the Scottish Geographical Society (11/1/86), and later the Bradford School Board (19/2(1886). The exhibiton was in some cases accompanied by a linked address by Keltie on the subject, (see Keltie Report (1886), pp. 182-203; and J.M.G.S. (1886) pp 241-258.)

In the United States, W. M. Davis systematically outlined the equipment in a 'geographical laboratory'. This included lantern slide provision, control of light by shutters, daily weather maps, a platform with a large globe in front, blackboards with outline maps of the world and United States, racks for hanging maps, a screen for projection on a spring roller suspended from the ceiling, boxes classified for slides, specimens of rocks and minerals, cases for map sheets and models, racks for storing wall maps, chests for topographical survey sheets, geographical models of physical features, photographs and pictures from magazines fixed on brown paper and kept in stiff portfolios, books of references and working tables, and equipment for holding the clay, wax pulp or sand to be used for modelling, (1898, pp. 170-181).

Descriptions

The study of home geography was, however, generally seen as a means to wider end, that of world coverage. The ultimate object of geography remained that of familiarising children with the world's places and peoples, and maintaining a balance between the physical and political elements of the subject.

Although an educational progressive by repute, Professor Pillan's approach to geography was disappointingly narrow, seeing it largely as a means of support for classical study. He nonetheless stressed the need to surround the names of places 'with agreeable associations' (1858, pp. 21-22). Similarly, an anonymous article in *The Educational Expositor* of 1853 advocated the use of historical and picturesque descriptions of large cities, exemplifying with an account of Lyons in a Dumas travel book (p.83).

An important means of 'bringing the world into the classroom' was through the vivid eye-witness description of the distant land. H.M.I. Synge on the Norwich district (*R.C.C.E.* 1880-1, p. 399), wanted interesting books of travel published in a form suitable for school use. Birchenough referred back to a text so used in the early nineteenth century, entitled *Scenes in Asia for the Amusement and Instruction of Little Tarry-at-Home Travellers*, including a pot-pourri of verse, prose and engravings which while 'pleasing in effect', was 'full of inaccuracies' (1913-4, pp. 142-143).

The type of descriptive passages advocated included graphic verse, as in Longfellow's *Hiawatha* (Welpton, p. 349); historical descriptions associated with imperial expansion, such as Spain by reference to the Peninsular War, India via the Life of Lord Clive and the Sepoy Mutiny, Ireland by the account of the Irish campaign in Oliver Cromwell's *Letters and Speeches*, Australia by 'unfolding the story of its gradual settlement and colonisation' (Fearon, p.77); or studies of exotic lands and dramatic scenery, as in the Alps, Himalayas and the like (Fitch, p. 360).

Such descriptions generally served a double use: not simply to savour reality, but also to add substance to the credo that Britain was the greatest country on earth. As Markheim put it (R.C.C.E., 1878-9, p. 643), geography was the ideal subject for the children of

> 'a race like ours, which of all others may in a certain sense, be said to be the most geographical; a race of boundless and ever-expanding energies, which, pent up within its island limits has at all times felt so powerfully the attraction of perpetual ocean contact; a race "born to create empires", and which has spread itself, its laws, its manners, its language in all continents of the globe....'

The very choice of material seemed designed to foster polarity and stereotyping, for example by contrasting the Eskimo with the people of the home district, 'the life of the wandering Bedouin' with the 'lowland farmer in England'; while stories of travellers lost in desert, forest or lonely island, 'of encounters with wild beasts, of heroism in the face of great natural dangers...', no doubt reinforced the feeling of security within the bosom of advanced civilisation in the homeland (see Board of Education, 1914, p.6).

Visual Aids

Supplementing the travel book was the visual aid. During this period, to engravings were added photographs. These could be presented in the form of lantern slides, or in text-books. Advocacy of the usefulness of pictures in forming sense impressions goes back at least to the time of Comenius (see Turner, 1972, p.117; Watson, 1909, reprint 1971, p. 112; and Birchenough, 1911-2, p.46). It is interesting that the foundation of the Geographical Association resulted from the initiative of a public schoolmaster, B. B. Dickinson of Rugby, in suggesting a scheme for the postal exchange of lantern slides. A meeting was arranged at Oxford in May 1893, and the idea was accepted as a good one. Such slides were cautiously welcomed as a 'valuable auxiliary' in classwork.

> 'If slides were few in number and well selected for questioning, there was little danger that the lesson would degenerate into an entertainment; complete darkening was not necessary so dangers to discipline were not too serious' (Fleure 1953., pp. 236-240).

Once established, the Geographical Association promoted the use of visual aids. Thus the Geographical Teacher, of 1905-6 gave details of a 'view slide' scheme of the Geographical Assocaition, with teachers able to hire slides at 1d per fortnight or buy them at one shilling or 1 shilling and 2 pence each from a commercial company in New Malden, Surrey (The Geographical Teacher, pp. 227-232). In the same journal, C. C. Carter pointed to the camera and the bicycle as two of the most valuable adjuncts of the geography teacher (1901-2, p. 27). Another well-known name in the history of geography teaching, J. F. Unstead, saw the use of pictures as crucial:

> '... verbal descriptions, however graphic, cannot form the mental images which are necessary as a basic for all geographical study'.

and particularly so in the lower classes. He found stereoscopic views, linked with maps, especially helpful, if the expense could be met. (The Geographical Teacher, 1905-6 pp. 213-216).

The Board of Education's suggestions in 1914 similarly insisted that descriptive extracts should be supplemented by

> 'well-selected pictures, photographs, and, where possible, lantern slides, or real scenery...... especially necessary in large towns, where the children's experience of natural phenomena is very limited.' (p.7)

Unresolved tensions

For all the wealth of progressive ideas, actual application in the classroom was disappointingly limited. Geography remained largely a fact subject, rejected as unfit for many a grammar school, in which environment it remained a soft option (see Keltie Report, 1886, pp. 90-96). As previously indicated, tensions existed between three variables. On the one hand, geography was an important element in the elementary curriculum, designed to exercise at least some control over the mass of the population, seen to be potentially unstable and a social risk if left uneducated. In contributing to this function, geography's scope was necessarily limited, and characterised by its plethora of factual content, as was its pedagogy, monitored by a catechetical system of teaching which involved whole classes rather than individual children chorusing prescribed answers in response to equally prescribed stimuli from pupil teachers. This is, of course, a stereotype that was breaking down in a significant number of schools later in the century, and especially in the 'higher elementary' classes. But it is doubtful whether the more progressive institutions formed more than a small minority. The methodology for improvement was nonetheless widely known.

The second tension related to the academic divisions within the subject. Hughes strongly urged that geography should be thought of as a conjunction between its physical and political components, as did Major General Rawlinson, in his evidence to the Devonshire Commission (1873, p.269). Hughes stressed also the pedagogic importance of this connection. Learning of names alone, characteristic of political geography, 'devoid of connection with antecedent or consequential truths', as associated with physical geography, was seen as dangerous. Only by looking at the 'why' and the 'wherefore' was geography raised 'from the place of a mere treasure-house of facts, to the dignity of a science' (1870, p.8). Montefiore similarly argued for a scientific, inductive approach to be taught by the 'most luminous method' of comparison and contrast (1894, pp. 313-314).

But this scientific infusion threatened a dangerous split. Inspired by Darwin, great natural scientists such as Huxley and Geikie bid fair to change the face of the subject, not ignoring human geography but certainly giving greater priority to its physical side. Natural science was in the ascendant. In 'political geography' there was little of academic substance. Huxley's Physiography provided an interesting case study, defining for many school children the nature of the subject for, under the Science and Art Examinations physical geography became extremely popular in many secondary schools (see Stoddart, 1975, pp. 17-24). But Huxley's concept fell between the two stools of geography and natural science. While in the schools 'physiography' became 'physical geography', Huxley's disparaging remarks about the latter did not endear him to academic geographers. (see Hart, 1957, p.118).

Similarly, the introduction of physiography into schools as a mere substitute for science did not appeal to the pioneers of a more 'rigorous' approach to science education. Thus Armstrong condemned Huxley's physiography as a 'rank and pretentious hybrid' (Stoddart, p.3[illegible]).

While in the United States geography tended to split into its human and earth science components, in this country the work of Mackinder and Herbertson in particular ensured that it remained a unitary subject, its physical and human dimensions drawn together. But the conceptual framework which achieved this was academic and sophisticated, and not necessarily readily applicable in the classroom. In fact, Cantor (1960) suggests that Mackinder's insistence on geography being an intellectual discipline, even in schools, led him to expect too much of the average child (p.318).

The third tension which emerged thus lay between progressive and academic approaches to the study of geography in school. The dichotomy was clearly stated. Progressive educational methods were conceived of as most appropriate to initiating younger children into the mysteries of knowledge. For the secondary school pupil, the ultimate aim was university entrance. More rigour was needed here and university geography must provide the model. Thus Rooper (1901) argued against the concentric method on the grounds there was no sequence or continuity in geography from one scale of study to the next to justify it, as there was in history. It would be absurd for the child to concentrate on the facts of his school and streets around, and know nothing of the world as a whole (p.7). The progressive Geikie ideal was dismissed, implicitly if not explicity, in favour of a 'new geography' in school.

The new discovery was Herbertson's 'Natural Regions of the World', which he regarded as applicable in one form or another at all levels. Through it, school geography gained a respectable academic framework. No longer need the study of the world to be a catechism based on the myriad political units. The scheme resolved the implicit schism between physical and political geography, and furnished a pedagogic model. As Thomas Pickles wrote in the introduction of one of many Herbertsonian texts of the first half of this century:

> 'By this means a survey of the world is made relatively easy since when we have learnt the geography of one region we can easily learn the geography of another region of the same type'. (1939, p.35).

Unfortunately, the 'type' natural regions text for schools too readily degenerated into comparable aridity, albeit of a conceptually more sophisticated nature, as the old political geographies. Major difficulties of conceptualisation were posed by the sophisticated generalisations and linguistic condensation of Herbertson's scheme (see Jay, 1965, p.256, and Marsden, 1979, pp. 60-61).

A geographical educationist contemporary with Herbertson, Miss A. J. Cooper, Tutor of Women Students and Mistress of Method to the Oxford Delegacy for the Training of Teachers, following up Herbertson's 'Natural Regions' paper in The Geographical Teacher of 1905, seems to have suspected as much. Acknowledging the major advance it made on 'crude political divisions', she questioned whether such an involved method of systemetisation was appropriate for younger pupils. What was needed was for practical teachers and expert geographers to keep in touch with each other. The practitioner was needed to apply Herbertson's scheme in a realistic way in the classroom (pp. 113-114). Of course, Herbertson and his disciples themselves went on to write the school texts, with Herbertson's Senior Geography, first published in 1907, not going out of print until 1952.

One of the more interesting outcomes of such exploratory research is the sense of the power generated by the right people in the right situations. The strong personality in the wrong context has much less purchase. Thus Herbertson's influence was crucially enhanced, in the particular, by the concurrent efforts of the prestigious Royal Geographical Society to establish geography in the universities and of the Geographical Association to spread the gospel in the secondary schools and, in the general, by the post-school board era shift towards a grammar school system based on the ethos of the public schools and an academically rigorous approach. The Geikie-Huxley type synthesis between child-centred ideas and academic respectability was left in something of a limbo. It could be presented as 'not really geography'. In any case, Huxley and Geikie were members of other 'establishments', outside the emerging geographic academic sphere of influence. But the reasons for the relative failure of one approach are as important to examine as those of the relative success of the other. Similarly, the story of how geography lost out in the United States, and was incorporated as a mere contribution to, for example, the progressive and integrated curriculum programmes of the social reconstructionists of the inter-war period, would be a compelling one to pursue as a comparative study.

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RESEARCH METHODS
IN
INVESTIGATING CHILDREN'S AND ADOLESCENTS' PERCEPTIONS OF THEIR ENVIRONMENT

by

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In 1971 Stapp advanced an Environmental Education Program K-12 arguing that it was a prime educational responsibility to develop an environmentally sensitive society. By this he meant that school systems should

> ... provide the opportunity for youth to explore their environment, both physically and intellectually, in order to obtain both the motivating concern and the factual knowledge regarding man's relation and responsibility to his environment (Stapp, 1971, p.266).

While such environmental education provisions undoubtedly reflect an appropriate and necessary role for schools to undertake, there remains the underlying assumption that there are adequate research bases from which to develop such programmes K-12.

What, in fact, do we know about how children and adolescents perceive their environment? How much research has focussed on this area? To what extent have the methodological bases been sound? To what extent are there large tracts of terrae incognitae? These questions can only be answered by a thoroughgoing analysis of the existing research. To that end the following table (Table 1) provides a summary overview of environmental perception studies conducted during the twentieth century.

In order to clarify the major methodological base of each of the studies included in the table, the table itself has been divided into five major sections thus:

A studies which have a free recall sketch map as a focal methodological base;

B studies which have an oral interview as a focal methodological base;

C studies which have a primary writing base;

D studies which have test data as a focal methodological base;

E studies which use preference ranking/rating data as a focal methodological base.

It is recognized, of course, that this organization necessarily has its basis in the present author's interpretation of focal methodological base but it is argued that such a classification provides a useful framework within which to discuss research methodology and trends.

Within each of the sections identified in the previous paragraph the studies are presented in chronological order. Also, apart from the basic descriptive categories of author, date, country of origin, and title of study, the studies are classified in terms of aims, number and kind of subjects, and the major data collection and method of analysis base. No attempt has been made to record the major findings of these studies - not only because some of the studies are avowedly only tentative explorations but also because the central purpose of the present overview was to examine selection of subjects and methods of data collection and analysis.

TABLE 1

CHRONOLOGICAL OVERVIEW AND ANALYSIS OF MAJOR PERCEPTION STUDIES (1908-1982)*

A. FREE RECALL SKETCH MAP STUDIES

AUTHOR/S	GULLIVER 1908
COUNTRY OF ORIGIN	USA
TITLE OF STUDY	Orientation of maps
AIM	An 'informal' investigation of children's ability to use directions in map drawing of their immediate school surroundings.
NUMBER	
NATURE OF GROUP	School children just beginning the study of geography.
MAJOR DATA/ ANALYSIS BASE	Drawing of portion of immediate school surroundings with which personally familiar. In some cases child told where north/south line lay in reference to building as mode of orientation.

AUTHOR/S	SAARINEN 1967
COUNTRY OF ORIGIN	USA
TITLE OF STUDY	Image of the University of Arizona campus
AIM	To determine the image of the campus held by University of Arizona students.
NUMBER	200
NATURE OF GROUP	Students from 12 different departments.
MAJOR DATA/ ANALYSIS BASE	Sketch map of the "university area".

AUTHOR/S	SIEVERTS 1967
COUNTRY OF ORIGIN	USA
TITLE OF STUDY	Perceptual Images of the City of Berlin.
AIM	To determine the perceptual images of two distinct parts of the town and their relation to each other: a workers' district and the city itself.
NUMBER	230
NATURE OF GROUP	School children aged 7-17 and from different types of school in the same block.
MAJOR DATA/ ANALYSIS BASE	Up to 10 years - drawing of way home from school + remembered objects; 10-14-drawing of residential quarter; 15+ - interviews to elicit verbal descriptions.

AUTHOR/S	GOODEY, DUFFETT, GOLD, & SPENCER 1971
COUNTRY OF ORIGIN	UK
TITLE OF STUDY	An Exploration into the image of central Birmingham as seen by area residents.
AIM	The project which emerged had three exploratory intentions: 1 To experiment with the possibility of obtaining information in the form of 'mental maps' from a wide range of city residents without recourse to personal interview; 2 By using the medium of a newspaper, it was intended to gain some evidence as to the success of 'image' displays and articles in attracting and focusing public discussion on urban design issues; 3 To examine the problems and potential of cooperating with a newspaper in an exercise of this sort.
NUMBER	167
NATURE OF GROUP	55% under 20 years of age; male/female ratio = 95:72; 50% lived in Birmingham for up to 5 years.
MAJOR DATA/ ANALYSIS BASE	Unique "city scene" experiment in collaboration with the Birmingham Post "What is your image of Birmingham?" - via rough sketch map of the area plus some factual details concerning respondents.

AUTHOR/S	MAURER & BAXTER 1972
COUNTRY OF ORIGIN	USA
TITLE OF STUDY	Images of the neighborhood and city among black Anglo & Mexican-American children.
AIM	To explore children's imagery or "mental pictures" of their world - their homes, neighborhoods, trips to school, their city, and their favourite and disliked places in the community.
NUMBER	93 but 2 did not complete the task.
NATURE OF GROUP	Community of Harrisburg, Texas. Children aged 6-14. Mexican-American N = 28. Anglo N = 30. Black N = 35. 40M + 51F.
MAJOR DATA/ ANALYSIS BASE	Interview: Test from basic data plus "Draw me a map of your neighborhood, of where you live ... Please tell what each thing is that you draw", + map of city of Houston + description of trip from home to school.

AUTHOR/S	BISHOP AND FOULSHAM 1973
COUNTRY OF ORIGIN	UK
TITLE OF STUDY	Children's Images of Harwich.
AIM	To study the developmental aspects of mapping and the relationship between maps and the physical fabric represented in them. To study the development of environmental awareness.
NUMBER	233
NATURE OF GROUP	32M + 35F from two junior schools, 67M + 99F from one country high school + some 6 year olds (number unspecified).
MAJOR DATA/ ANALYSIS BASE	Draw a map showing your route from home to school, showing the things you notice on the way.

AUTHOR/S	SAARINEN 1973
COUNTRY OF ORIGIN	USA
TITLE OF STUDY	Student Views of the World.
AIM	To explore in a preliminary fashion student views of the world as reflected in freehand sketch maps.
NUMBER	265
NATURE OF GROUP	4 groups of high school students in USA, Canada, Finland and Sierra Leone with attempted match on age, sex, education.
MAJOR DATA/ ANALYSIS BASE	Sketch map of world indicating all places considered interesting and/or important.

AUTHOR/S	SPICER 1974
COUNTRY OF ORIGIN	Australia.
TITLE OF STUDY	Perception and Reality: The Adolescent's subjective view of his micro and macro space.
AIM	1. To gain an understanding of the perception that a sample of individuals have of their local neighbourhood and metropolitan area. 2. To describe what the environment in which he lives actually means to the adolescent as a nascent individual and the extent to which the functional importance of features in that environment determines their place in his image.
NUMBER	200
NATURE OF GROUP	105M + 95F 15 yr old (Form IV) high school students from 2 low social status and 2 high social status areas.
MAJOR DATA/ ANALYSIS BASE	Individual free recall sketch maps of local and city urban area + interview data, questionnaire data and specific knowledge data of metropolitan area of Melbourne.

AUTHOR/S	BANERJEE with JOHNSON and KIRSHNER 1975a
COUNTRY OF ORIGIN	Mexico
TITLE OF STUDY	Children's perceptions of the Environment: A Case Study in Toluca, Mexico.
AIM	International Study on the spatial environment of children: To focus on the way in which children use, image, and value their spatial environment, particularly where that is changing rapidly due to planned or induced development.
NUMBER	20
NATURE OF GROUP	(10M + 10F)
MAJOR DATA/ ANALYSIS BASE	Image maps plus interviews of children with particular emphasis on exploring the differences in both behaviour and perception.

AUTHOR/S	BANERJEE with CALZADA and KRAMACHER 1975B
COUNTRY OF ORIGIN	Mexico
TITLE OF STUDY	The Environment and Child Perception, and The Environmental Perceptions of Adolescent Boys and Girls, San Augustin, Ecatapec, Mexico.
AIM	International Study on the spatial environment of children: To focus on the way in which children use, image, and value their spatial environment, particularly where that is changing rapidly due to planned or induced development.
NUMBER	20
NATURE OF GROUP	10M + 10F.
MAJOR DATA/ ANALYSIS BASE	Image maps plus interviews of children with particular emphasis on exploring the differences in both behaviour and perception.

AUTHOR/S	SPICER 1975
COUNTRY OF ORIGIN	Australia
TITLE OF STUDY	How the adolescent perceives his micro environment: some implications for geographical education.
AIM	To explore different aspects of adolescents' perceptions of their micro and macro space.
NUMBER	200
NATURE OF GROUP	15 years (105M + 95F)
MAJOR DATA/ ANALYSIS BASE	Free recall map of local area.

AUTHOR/S	POCOCK 1976
COUNTRY OF ORIGIN	UK
TITLE OF STUDY	Some characteristics of mental maps: an empirical study.
AIM	To explore the image of the city of Durham from both the inside (residents) and the outside (visitors).
NUMBER	
NATURE OF GROUP	Residents, visitors, summer tourists.
MAJOR DATA/ ANALYSIS BASE	Unsupervised questionnaire, the last item of which was a free recall map exercise.

B. ORAL INTERVIEW STUDIES

AUTHOR/S	LUKASHOK & LYNCH 1956
COUNTRY OF ORIGIN	USA
TITLE OF STUDY	Some childhood memories of the city.
AIM	A methodical study of childhood memories - to what does the child pay attention in his outdoor physical world; and how does he respond emotionally to these features?
NUMBER	40
NATURE OF GROUP	22 MIT students + 18 non-students with wide range of occupations. Age range 18-32. (33M + 7F) Majority middle class.
MAJOR DATA/ ANALYSIS BASE	Tape recorded interviews beginning with questions concerning home and street to encourage free recall, etc., then direct questions relating to traffic, neighborhood and attitude to the city as a whole. Then preferences explored.

AUTHOR/S	LADD 1970
COUNTRY OF ORIGIN	USA
TITLE OF STUDY	Black youths view their environment: Neighborhood maps.
AIM	How do adolescents view their neighborhood? 1. To develop an understanding of areas subjectively defined as neighborhoods by urban adolescent black boys through their graphic representations of their neighborhoods; 2. to discover the socially and psychologically significant aspects of the "contents" of their neighborhoods as reflected in their maps; 3. to explore the potential informational value of map drawings to social scientists and planners.
NUMBER	60
NATURE OF GROUP	Black adolescents age range 12-17 low income families attending same junior high school.
MAJOR DATA/ ANALYSIS BASE	Verbal descriptions and freehand maps.

AUTHOR/S	DALE 1971
COUNTRY OF ORIGIN	UK
TITLE OF STUDY	Children's reactions to maps and aerial photographs.
AIM	To explore whether the vertical aerial photograph is a satisfactory vehicle for communicating geographic information to the uninitiated.
NUMBER	40
NATURE OF GROUP	Primary School eight miles east of Cambridge.
MAJOR DATA/ ANALYSIS BASE	Interviews in pairs re. map and vertical aerial photograph of village - identification tasks + preference.

AUTHOR/S	PORTEOUS (with SMITH) 1971
COUNTRY OF ORIGIN	Canada
TITLE OF STUDY	Design with people: the quality of the urban environment.
AIM	To explore "home range".
NUMBER	25
NATURE OF GROUP	Burnside gang.
MAJOR DATA/ ANALYSIS BASE	Participant observation.

AUTHOR/S	ANDERSON & TINDALL 1972
COUNTRY OF ORIGIN	USA
TITLE OF STUDY	The concept of home range: New data for the study of territorial behavior.
AIM	To elicit accurate home range data from elementary school children.
NUMBER	100
NATURE OF GROUP	Black, second and fourth grades.
MAJOR DATA/ ANALYSIS BASE	Interview using neighborhood photo stimuli.

AUTHOR/S	BATTRO & ELLIS 1972
COUNTRY OF ORIGIN	Argentina
TITLE OF STUDY	International Study of the Impact of Economic Development on the Spatial Environment of Children: Salta, Argentina.
AIM	International Study on the spatial environment of children: To focus on the way in which children use, image and value their spatial environment, particularly where that is changing rapidly due to planned or induced development.
NUMBER	20
NATURE OF GROUP	9M + 11F aged 11-14 years living in suburbs of Villa las Rosas.
MAJOR DATA/ ANALYSIS BASE	Interviews re house and environment - parents and children plus test of children's ability to draw the route from the school to a specific point in the city.

AUTHOR/S	LADD 1972
COUNTRY OF ORIGIN	USA
TITLE OF STUDY	Black youths view their environment: some views of housing.
AIM	To explore questions such as: What indeed does the reality of their present housing mean to poor black youth? - What do they measure it against? - What are their dreams with respect to their future housing and lifestyles?
NUMBER	60
NATURE OF GROUP	Black adolescent boys from low income backgrounds (aged 12-17).
MAJOR DATA/ ANALYSIS BASE	Tape recorded interviews conducted by 3 black males - 1) to describe their neighborhoods verbally; 2) to draw neighborhood map; 3) to describe their houses or apartments, both inside and outside; 4) to describe the housing they would like when they are "grown" and "on their own".

AUTHOR/S	ROZELLE & BAXTER 1972
COUNTRY OF ORIGIN	USA
TITLE OF STUDY	Meaning and value in conceptualizing the city.
AIM	An initial exploration of some elements of the meaning-value dynamics that may operate in people's images of a large metropolitan area.
NUMBER	52
NATURE OF GROUP	Literate and educated residents of Houston; Texas University students.
MAJOR DATA/ ANALYSIS BASE	Individual interviews based on three direct questions designed to explore meaning-value issues.

AUTHOR/S	DOWNTON 1973
COUNTRY OF ORIGIN	Australia
TITLE OF STUDY	Children's Perception of Space Project: Melbourne Study.
AIM	International Study on the Spatial Environment of Children: To focus on the way in which children use, image and value their spatial environment, particularly where that is changing rapidly due to planned or induced development.
NUMBER	20
NATURE OF GROUP	9M + 11F aged 14-15 years living in Western suburbs (low SES) of Melbourne.
MAJOR DATA/ ANALYSIS BASE	Interviews of children, parents and planners. Observations in the area - Photographing in the area. Timing - during school holidays.

AUTHOR/S	SANOFF 1973
COUNTRY OF ORIGIN	USA
TITLE OF STUDY	Youth's Perception and Categorizations of Residential Cues.
AIM	To explore teenagers' perceptions of the social meaning of the environment. To explore ways in which social learning takes place through classification schemes youths use to describe and evaluate residential settings.
NUMBER	150
NATURE OF GROUP	High school students residing in urban and rural settings.
MAJOR DATA/ ANALYSIS BASE	Oral description of similarities and differences between 12 selective photographs of residential settings plus responses to questions about House Preference, Present House Type and Environmental Disposition.

AUTHOR/S	TOMASZEWSKI 1974
COUNTRY OF ORIGIN	Poland
TITLE OF STUDY	Child's Perception of the Environment: UNESCO Project realized in Poland, 1973-4.
AIM	International Study on the Spatial Environment of Children: To focus on the way in which children use, image and value their spatial environment, particularly where that is changing rapidly due to planned or induced development.
NUMBER	100 to 150
NATURE OF GROUP	5 groups ranging in size from 20-30. Each group from a different area, including rural; elementary school.
MAJOR DATA/ ANALYSIS BASE	Interviews with children re degree of knowledge of surrounding areas plus perception of their own environment. Production of maps/drawings of environment.

AUTHOR/S	FIEN, WILSON and SLATER 1982
COUNTRY OF ORIGIN	Australia
TITLE OF STUDY	Children and their Environment: Place Knowledge, Experiences and Values about the local Area.
AIM	To investigate the place knowledge, values and interests of a group of twelve-year-old children in an inner suburb of Brisbane, Australia.
NUMBER	27
NATURE OF GROUP	State primary school.
MAJOR DATA/ ANALYSIS BASE	Interview on one-to-one basis using the "Child Environment Interview Schedule" derived from the work of Hart (1979) and Lynch (1977).

AUTHOR/S	KUSHNIR 1982
COUNTRY OF ORIGIN	Israel
TITLE OF STUDY	Skylab effects: Psychological reactions to a human-made environmental hazard.
AIM	To probe the hypothesis that knowledge about the impending event would result in emotional arousal to the extent that individuals would appraise skylab as potentially harmful.
NUMBER	274
NATURE OF GROUP	People from all walks of life and all ages over 15. 119M + 155F.
MAJOR DATA/ ANALYSIS BASE	Oral interview questions concerning state anxiety; subjective probability of injury; and trait anxiety.

C. STUDIES WITH A PRIMARY WRITING BASE

AUTHOR/S	HADDON 1960
COUNTRY OF ORIGIN	UK
TITLE OF STUDY	A View of Foreign Lands.
AIM	To find out what things about foreign countries children find memorable; + what sort of general impression they have of countries studied in class (USA, France, South Africa, and Australia).
NUMBER	150
NATURE OF GROUP	Aged 13, 14, 15, 16 in four forms (74M + 76F)
MAJOR DATA/ ANALYSIS BASE	Write down in short phrases or single words the thoughts and images conjured up by the name of a particular country.

AUTHOR/S	FINE 1967
COUNTRY OF ORIGIN	USA
TITLE OF STUDY	A child's eye view of his world.
AIM	
NUMBER	
NATURE OF GROUP	
MAJOR DATA/ ANALYSIS BASE	

AUTHOR/S	COLLINS 1968
COUNTRY OF ORIGIN	USA
TITLE OF STUDY	Some Verbal Dimensions of Architectural Space Perception.
AIM	To determine the verbal dimensions along which the users of environments (i.e. an architecturally unsophisticated population) perceive space through the use of clustering and factoring procedures.
NUMBER	
NATURE OF GROUP	University students.
MAJOR DATA/ ANALYSIS BASE	Use of Craik's environmental descriptor checklist.

AUTHOR/S	NAHEMOW 1971
COUNTRY OF ORIGIN	USA
TITLE OF STUDY	Research in a novel environment.
AIM	To make the process involved in perceiving environments more amenable to study through the investigation of responses in a novel environment.
NUMBER	18
NATURE OF GROUP	Random. Age 13-34 years (13M + 5F).
MAJOR DATA/ ANALYSIS BASE	a) Field studies: Observation of behavior of individuals attending exhibits on display in New York City - Interview of random sample leaving the exhibits + children's drawings. b) Lab. studies: Simulated novel environments. c) Language description: Classified as experiential or structural.

AUTHOR/S	POCOCK 1973
COUNTRY OF ORIGIN	UK
TITLE OF STUDY	City of the Mind: A Review of Mental Maps of Urban Areas.
AIM	To explore the extent to which the individual's mental map is linked to his "action space: or "movement field".
NUMBER	
NATURE OF GROUP	Students and Residents in Dundee.
MAJOR DATA/ ANALYSIS BASE	Space Diaries taken over one month; outline of street pattern given a single street; free recall map of city area; perception of distance between specified landmarks and city centre.

AUTHOR/S	GOULD 1973
COUNTRY OF ORIGIN	Sweden
TITLE OF STUDY	The Black Boxes of Jönköping.
AIM	To explore the black box concept as a methodology for eliciting data re names of villages, farms and cities.
NUMBER	
NATURE OF GROUP	Ages 7, 9, 11, 13.
MAJOR DATA/ BASE ANALYSIS	Children were asked to "spill" their information on to paper by writing down all the places they could think of within a five minute time limit.

AUTHOR/S	SPENCER & LLOYD 1974
COUNTRY OF ORIGIN	UK
TITLE OF STUDY	A Child's Eye View of Small Heath Birmingham: Perception Studies for Environmental Education.
AIM	To investigate children's perception of their environment (to prepare the way for possible new "environmental education" activities in schools, in collaboration with local teacher).
NUMBER	16 classes of children.
NATURE OF GROUP	A range of schools including infants, junior, secondary, secondary selective and comprehensive.
MAJOR DATA/ ANALYSIS BASE	Four sessions involving written descriptions, cognitive maps, a "sensory walk" session, adjectival scaling via the semantic differential.

AUTHOR/S	BARTNIK & WALL 1975
COUNTRY OF ORIGIN	USA
TITLE OF STUDY	Children's perceptions of environmental problems.
AIM	
NUMBER	126
NATURE OF GROUP	K-8
MAJOR DATA/ ANALYSIS BASE	Drawings and essays on coal mining - content analysis.

AUTHOR/S	DESBARATS 1976
COUNTRY OF ORIGIN	U.S.A.
TITLE OF STUDY	Semantic Structure and Perceived Environment.
AIM	1. To demonstrate the use of a free-association test for eliciting qualitative data from which quantitative indices of similarity between 10 metropolitan areas can be derived; 2. To obtain hierarchical clusters of locations for both within subject and between subject data; and 3. To identify the weighted dimensions upon which the evaluations are based.
NUMBER	94
NATURE OF GROUP	Undergraduate psychology students.
MAJOR DATA/ ANALYSIS BASE	Free association to 10 selected metropolitan areas.

AUTHOR/S	DUECK 1976
COUNTRY OF ORIGIN	Canada
TITLE OF STUDY	Imageability: Implications for teaching geography.
AIM	To identify and trace the development of a cognitive structure (image of a neighborhood), which was assumed to exist....
NUMBER	210
NATURE OF GROUP	35 in each of grades 2, 4, 6, 8, 10, 12, randomly selected.
MAJOR DATA/ ANALYSIS BASE	Open-ended questions + task requiring listing of features considered important in own neighborhood.

D. TEST DATA BASED STUDIES

AUTHOR/S	LORD 1976
COUNTRY OF ORIGIN	USA
TITLE OF STUDY	A study of Spatial Orientation of Children.
AIM	To measure the ability of children to deal with three phases of spatial orientation: 1) ability to designate directions in space 2) ability to describe the spatial arrangement of familiar places, streets etc. in terms of location in space with reference to the subject; 3) ability to maintain one's orientation during travel.
NUMBER	317
NATURE OF GROUP	Students in grades V-VIII in typical rural schools of southern Michigan (173M + 144F).
MAJOR DATA/ ANALYSIS BASE	4 Tests of Orientation relating to aims of the study.

AUTHOR/S	SONNENFELD 1967
COUNTRY OF ORIGIN	USA
TITLE OF STUDY	Environmental perception and adaptation in the Arctic.
AIM	To develop a means for studying environmental sensitivies, attitudes and preferences.
NUMBER	150+
NATURE OF GROUP	Children from different Eskimo groups.
MAJOR DATA/ ANALYSIS BASE	Questionnaire, semantic differential and photo-slide test involving pairs of slides showing, e.g., a variety of natural landscapes.

AUTHOR/S	BARKER & BURTON 1969
COUNTRY OF ORIGIN	Canada
TITLE OF STUDY	Differential response to stress in natural and social environments: An application of a modified Rosenzweig Picture-Frustration Test.
AIM	To explore responses to perceived stress derived from or in some way associated with the natural environment.
NUMBER	71
NATURE OF GROUP	Summer School introductory geography students at University of Toronto.
MAJOR DATA/ ANALYSIS BASE	Modified Rosenzweig Picture-Frustration Test.

AUTHOR/S	CARR & SCHISSLER 1969
COUNTRY OF ORIGIN	USA
TITLE OF STUDY	The city as a Trip: Perceptual selection and memory in the view from the road.
AIM	To explore "the way in which people achieve, organize and transform sequential perceptions in forming a representation" of a driving trip.
NUMBER	49
NATURE OF GROUP	9 commuters + 40 college students average age 18-38; (29M + 20F)
MAJOR DATA/ ANALYSIS BASE	Analysis of head and eye movements and memory tests plus interview and subject reconstruction of experience.

AUTHOR/S	BLAUT, McCLEARY & BLAUT 1970
COUNTRY OF ORIGIN	USA
TITLE OF STUDY	Environmental mapping in young children.
AIM	Can children utilise environmental map, etc., without prior training?
NUMBER	107
NATURE OF GROUP	First grade.
MAJOR DATA/ ANALYSIS BASE	Identification of features on aerial photos. Pre-identification of features.

AUTHOR/S	JACKSON & JOHNSTON 1972
COUNTRY OF ORIGIN	NZ
TITLE OF STUDY	Structuring the image: an investigation of the elements of mental maps.
AIM	To study the images involved in the residential preferences for cities.
NUMBER	
NATURE OF GROUP	High School and University students living in Christchurch.
MAJOR DATA/ ANALYSIS BASE	Semantic differential with a specially developed lexicon of evaluative criteria.

AUTHOR/S	ANDREWS 1973
COUNTRY OF ORIGIN	Canada
TITLE OF STUDY	Home range and urban knowledge of school aged children.
AIM	
NUMBER	250
NATURE OF GROUP	158 Grade 9 and 92 Grade 13 Geography students in five schools.
MAJOR DATA/ ANALYSIS BASE	Outline map with location exercises.

AUTHOR/S	MASEY 1974
COUNTRY OF ORIGIN	USA
TITLE OF STUDY	A spatial Perception Study of Cincinnati: A View from Newport.
AIM	To investigate how a group of individuals action space is related to their value judgement of a number of neighborhoods.
NUMBER	6 classes
NATURE OF GROUP	High School students in Newport, Kentucky.
MAJOR DATA/ ANALYSIS BASE	2 questionnaires - 1 using the semantic differential technique and the other a 7 point rating scale. Order of administration was counter-balanced.

AUTHOR/S	MACKAY 1976
COUNTRY OF ORIGIN	USA
TITLE OF STUDY	The effect of spatial stimuli on the estimation of cognitive maps.
AIM	To explore the congruence of subjects and physical maps of cities.
NUMBER	115
NATURE OF GROUP	Geography and non-geography students.
MAJOR DATA/ ANALYSIS BASE	Evaluation of a set of data.

AUTHOR/S	SADALLA AND MAGEL 1980
COUNTRY OF ORIGIN	USA
TITLE OF STUDY	The Perception of Traversed Distance.
AIM	To provide a direct test of the angularity hypothesis.
NUMBER	40
NATURE OF GROUP	Introductory Psychology student volunteers.
MAJOR DATA/ ANALYSIS BASE	Exporation of the illusion which apparently affects the cognition of traversed distance.

AUTHOR/S	SPICER 1980
COUNTRY OF ORIGIN	Australia
TITLE OF STUDY	The role of Language and Personality in Geographical Recognition at level 10 in the Australian school: A micro study.
AIM	To relate perception of the macro environment to behaviour towards others in the macro environment.
NUMBER	20
NATURE OF GROUP	Female students identified as High Extroversion/Writing or High Extroversion/Spatial representation; or High Introversion/Writing or High Introversion/Spatial Representation.
MAJOR DATA/ ANALYSIS BASE	a) Environmental Response Inventory (after Winkel, Malek and Thiel, 1969); b) Spicer-Davis Social Environmental Picture Frustration (SEPF) Test (after Rosenzweig (1946), and Barker and Burton (1969).

AUTHOR/S	STOLTMAN 1980
COUNTRY OF ORIGIN	USA
TITLE OF STUDY	Children's conception of Territory: United States.
AIM	Primarily to test the comparability of Piaget's spatial stages to the development of the concept of territory in an American sample of children.
NUMBER	204
NATURE OF GROUP	Ramdomly selected from a population of 2292 children from grades one through six.
MAJOR DATA/ ANALYSIS BASE	Territory Conception Test.

AUTHOR/S	JORGENSON 1981
COUNTRY OF ORIGIN	USA
TITLE OF STUDY	Perceived Causal Influences of Weather.
AIM	To assess the extent to which subjects perceive the weather's influence.
NUMBER	127
NATURE OF GROUP	Introductory Psychology students (61M + 61F).
MAJOR DATA/ ANALYSIS BASE	Weather Beliefs Inventory Locus of Control scale.

AUTHOR/S	WILSON & GOODWIN 1981
COUNTRY OF ORIGIN	Australia
TITLE OF STUDY	How do twelve and ten-year-old students perceive rivers?
AIM	To investigate the perception of rivers held by twelve and ten-year old students.
NUMBER	33 + 30
NATURE OF GROUP	Year 5 students Year 7 students.
MAJOR DATA/ ANALYSIS BASE	Test involving four sections: A - Words to Describe a River. B - Drawings of a River. C - Paired Words in Relation to Rivers. D - Descriptive Words for the Local River.

AUTHOR/S	McGILL & KORN 1982
COUNTRY OF ORIGIN	USA
TITLE OF STUDY	Awareness of an urban environment.
AIM	To determine the relative impression on memory made by wall murals; to investigate the impact of familiarity with the environment on what is remembered.
NUMBER	40 Exptl. + 20 Control.
NATURE OF GROUP	College students in Counterbalanced Design.
MAJOR DATA/ ANALYSIS BASE	Comparison of Experimental and Control Groups' performance on free recall and recognition tasks after Experimental group had experienced a drive on a 1.7 mile route through the local small business neighborhood.

E. PREFERENCE BASED STUDIES

AUTHOR/S	GOULD 1965
COUNTRY OF ORIGIN	USA
TITLE OF STUDY	On mental maps.
AIM	To explore residential desirability - i.e. to see if it is possible to break apart and simplify the structure underlying the views and values men hold and place upon geographic space.
NUMBER	25 - 50
NATURE OF GROUP	Beginning geography students in 4 State universities.
MAJOR DATA/	Rank order lists of 48 contiguous States in terms of personal preferences used to provide composite preference maps.

AUTHOR/S	GOODEY 1968
COUNTRY OF ORIGIN	USA
TITLE OF STUDY	A Pilot Study of the Geographical Perception of North Dakota students.
AIM	To discover North Dakota student preferences for residence in other American states and for tourist trips to European states.
NUMBER	400
NATURE OF GROUP	Introductory Geography students.
MAJOR DATA/ ANALYSIS BASE	- Naming states of USA on blank map - Visiting Patterns within US - Preference ranking of states according to desirability for future residence.

AUTHOR/S	GOULD & WHITE 1968
COUNTRY OF ORIGIN	USA/UK
TITLE OF STUDY	The mental maps of British school leavers.
AIM	To explore the residential preferences of British school leavers.
NUMBER	
NATURE OF GROUP	23 different locations.
MAJOR DATA/ ANALYSIS BASE	Ordering of 92 choices of residential desirability.

AUTHOR/S	HICKS & BEYER 1968
COUNTRY OF ORIGIN	USA
TITLE OF STUDY	Images of Africa.
AIM	To identify existing knowledge about and impressions of Africa before the formal introduction of Project Africa.
NUMBER	3259
NATURE OF GROUP	Average ability 7th and 12th graders in 28 school districts across 24 states of the USA chosen to be representative.
MAJOR DATA/ ANALYSIS BASE	1) World Regions Perception Survey consisting primarily of an outline map of the world and a deck of stimulus cards. 2) Africa south of the Sahara - a paper and pencil objective test of specific and general knowledge about this region.

AUTHOR/S	SONNENFELD 1969
COUNTRY OF ORIGIN	USA
TITLE OF STUDY	Equivalence and distortion of the perceptual environment.
AIM	How does one determine what it is thought constitutes the environment to which a population is sensitive?
NUMBER	
NATURE OF GROUP	Jnr. High School students in 3 Alaskan villages + comparison group from Delaware.
MAJOR DATA/ ANALYSIS BASE	Semantic differential + preferences for landscapes.

AUTHOR/S	GOULD & OLA 1970
COUNTRY OF ORIGIN	USA/UK
TITLE OF STUDY	The Perception of Residential Desirability in the Western Region of Nigeria.
AIM ANALYSIS BASE	a) To investigate how mental images change from childhood to adulthood. b) To investigate space preferences.
NUMBER	500 but 431 usable
NATURE OF GROUP	Students in approx. age groups (13,15,18, & 23) from 5 different locations.
MAJOR DATA/ ANALYSIS BASE	Questionnaire re space and residential preferences.

AUTHOR/S	JOHNSTON 1971	
COUNTRY OF ORIGIN	NZ	
TITLE OF STUDY	Mental maps of the City: suburban preference patterns.	
AIM	1) Do residents agree on the status rankings of suburbs within their city; 2) Do residents agree on the relative desirability of these suburbs as living area? 3) Are the status and desirability scales highly correlated? 4) Do the mental maps from which the 2 scales are produced contain any clear sectoral bias?	
NUMBER	50	120
NATURE OF GROUP	Geography I University students.	Random city households.
MAJOR DATA/ ANALYSIS BASE	Ranking of suburbs on residential desirability and ranking of suburbs on perceived status.	

AUTHOR/S	GILLMOR 1974
COUNTRY OF ORIGIN	Ireland
TITLE OF STUDY	Men[illegible]aps in Geographic Education: Spatial Preferences of [illegible] Leinster school leavers.
AIM	To investigate residential and vacation preferences using mental mapping.
NUMBER	369 usable questionnaires.
NATURE OF GROUP	500 sixth form students from 47 Leinster post-primary schools.
MAJOR DATA/ ANALYSIS BASE	Questionnaire to elicit residential choice and vacation preferences within Ireland, as well as residential and vacation preferences within the wider context.

AUTHOR/S	GOULD & WHITE 1974
COUNTRY OF ORIGIN	USA
TITLE OF STUDY	Environmental Preferences & Regional Images in America.
AIM	To examine the varying mental images that people hold.
NUMBER	
NATURE OF GROUP	University students at 5 locations - 4 in the north and west and one in the deep south.
MAJOR DATA/ ANALYSIS BASE	Ranking maps of 48 contiguous states.

AUTHOR/S	GÄRLING 1976
COUNTRY OF ORIGIN	Sweden
TITLE OF STUDY	The Structural Analysis of Environmental Perception and Cognition: a Multi-dimensional Scaling Approach.
AIM	To explore the meaningfulness of multi-dimensional scaling approaches in research into environmental perception and cognition.
NUMBER	40
NATURE OF GROUP	Undergraduate psychology students in groups with equal sex distribution - a different group for each methodological technique.
MAJOR DATA/ ANALYSIS BASE	In order to provide data for multi-dimensional scaling purposes, similarity and preference ratings, sorting methods and interviews were used with environmental displays as stimulus material.

AUTHOR/S	HORAYANGKURA 1978
COUNTRY OF ORIGIN	USA
TITLE OF STUDY	Semantic Dimensional Structures: A Methodological Approach.
AIM	To search for fundamental dimensional structures through two independent approaches - non-verbal and verbal - and to provide quantitative estimates of the agreement between the two sets of data.
NUMBER	75
NATURE OF GROUP	1st year undergraduate Princeton students both male and female native and non-native divided into 3 groups of 25 urban; non-urban; mixed.
MAJOR DATA/ ANALYSIS BASE	Sorting a set of environmental displays into groups and rating the same set of displays on a set of verbal scales.

AUTHOR/S	SOLOMON 1978
COUNTRY OF ORIGIN	USA
TITLE OF STUDY	Residential Preference of Black and White Students.
AIM	To explore a mental mapping exercise as a useful classroom exercise for the teacher to probe the students' worlds - whether experienced or imagined.
NUMBER	60
NATURE OF GROUP	Students in public high school in Orangebury, South Carolina (39 black + 21 white).
MAJOR DATA/ ANALYSIS BASE	Residential preferences à la Gould were used to create maps illustrating residential preference patterns for the two groups.

AUTHOR/S	CAIRNEY 1979
COUNTRY OF ORIGIN	Australia
TITLE OF STUDY	The Repertory Grid as a Predictor of Environmental Preference.
AIM	To explore the usefulness of personal construct theory as a framework for understanding how individuals conceptualize different areas of the city.
NUMBER	
NATURE OF GROUP	Social Sciences students; planning students; high school students.
MAJOR DATA/ ANALYSIS BASE	Environmental Constructs and Rated Preferences for twenty Adelaide Suburbs.

AUTHOR/S	PEAY, PEAY & SWAP 1979
COUNTRY OF ORIGIN	Australia
TITLE OF STUDY	Developmental and cross-cultural study of the perception of nations.
AIM	To investigate the formation of a cognitive "world view" by comparing the perceptions of children with those of adults and to explore differences between 2 nations (Australia & the United States of America).
NUMBER	6 samples
NATURE OF GROUP	University students and 7th grade children in South Aust. and 2 comparable samples of adult-child pairs at each of two U.S. locations.
MAJOR DATA/ ANALYSIS BASE	Rating of all pairs of a set of 15 countries on a scale of perceived "similarity", as well as rating each of the countries on several attribute scales.

AUTHOR/S	SLATER AND SPICER 1980
COUNTRY OF ORIGIN	Australia
TITLE OF STUDY	Perception and Preference Studies at the International level.
AIM	To survey 100 fifteen year old students in each of ten countries with the object of finding out (a) the country in which they would most like to live and (b) the country which they would most like to visit for a vacation.
NUMBER	100 x 10
NATURE OF GROUP	Students aged 15 in 10 different countries.
MAJOR DATA/ ANALYSIS BASE	Data collection and analysis procedures after Gillmor 1974.

AUTHOR/S	THORPE 1981
COUNTRY OF ORIGIN	Australia
TITLE OF STUDY	New South Wales in the Mind's Eye.
AIM	To measure the perceptions held by Year 10 high school students and associated parents in New South Wales of the different environments in that State.
NUMBER & NATURE OF GROUP	862 Year 10 high school students, 414 adults.
MAJOR DATA/ ANALYSIS BASE	Ranking of regions after Gould and White (1974).

AUTHOR/S	BALLING AND FALK 1982
COUNTRY OF ORIGIN	USA
TITLE OF STUDY	Development of Visual Preference for Natural Environments.
AIM	To explore human visual preferences for different types of natural landscapes.
NUMBER	100; 77; 96; 100; 14; 50; 34; 42.
NATURE OF GROUP	3rd, 6th, and 9th graders, college students, adults, senior citizens, professional foresters, teachers, and general adults.
MAJOR DATA/ ANALYSIS BASE	Perceptual judgements of (a) residential and (b) visiting desirability of 5 landscape types based on 20 slides - 4 representing each landscape type.

Notes

1. This table is necessarily incomplete on three counts:-
    a) the omission of much research which has taken place in the non-English speaking world and which, as a result, has not yet been reported in English language journals;
    b) the unavailability of certain information relevant to studies cited; and
    c) the almost inevitable omission of research which has escaped even the vigilance of the present writer.
2. In instances where information is unavailable for a particular entry in the table, e.g. number of subjects, the appropriate column/s of the table have been left blank.
3. Where the existence of a particular study have been reported in the literature but a copy could not be located, only the author/s, date, country of origin, and title of the study are recorded in the table.
4. The spelling of particular words, e.g., behaviour/behavior, which vary according to the country of origin of the article, has been retained in the original.

The first group of studies, those which have a free recall sketch map of an area as their central data base operate on the Lynchean assumption that such a device will reflect the individual's image or schema of his spatial environment. While clearly this is a reasonable assumption it does not take into account the individual's perception of himself as a drawer of maps which must surely affect the way he approaches the task. Moreover cartographic skills vary between individuals thus being also likely to mediate the quality of the image. None of the studies reported to date has adequately confronted these problems although some studies (e.g., Maurer and Baxter, 1972) have attempted to refine the data by extension - using an oral identification "please tell what each thing is that you draw" technique.

Studies which have used an oral interview as their focal data base have typically either been used to encourage free recall of or introspection about the environment or they have used a series of pre-determined questions to elicit information about or responses to the environment. That this technique has yielded valuable data is undeniable. However, against this recognition must be set two inherent and related problems. The first is that the success of such interviews (i.e., the quality of the data generated) depends in large measure on the quality of the communicative interaction between interviewer and interviewee. The second problem is that of interpreting the data thus generated.

In relation to the first problem there is now a considerable body of evidence (e.g., Labov, 1969) which argues that the efficacy of oral interview data is significantly affected by factors such as the age, sex and social class of the interviewer which, in turn, influence the way language is used and received. Similarly interpretation of oral interview data presents difficulties. Unless the interview data is to be used in an ethnographic research framework which few of the studies reported in Section B of Table 1 aspire to do, the researcher must encounter a number of decision points the resolution of which is not always amenable to easy justification. The first relates to the tape recording of such interviews - if they are taped a verbatim transcript is possible; if they are not taped but the interviewer takes notes then there must be selection and hence the possibility of bias. Even if full transcripts are available there remain problems of whether to attempt to quantify the data, how to classify responses, whether to select judicious quotation to substantiate the argument, etc.

Studies with a primary writing base avoid at least some of these problems since the "audience" for the writing does not have the same immediacy as does the interviewer in an oral situation and the writing exists as data without any need to make transcripts. However the skill of the individual in written language is likely to be as much of a factor in these studies as was cartographic skill in the studies using free recall sketch maps discussed earlier. The problems of analysing such data are, however, very similar to those arising from oral interviews. Attempts to limit the language generated, as in Collins's (1968) use of Craik's environmental descriptor checklist, solve one problem but restrict the nature of the data.

A similar restriction of data is an inevitable consequence of test based studies since the only data generated is a consequence of direct test items. While this facilitates comparability between individuals in terms of, for example, identification skills, idiosyncratic data relating to the individual's interaction with his or her environment tends to be precluded. The possible exception to this restriction is the kind of data produced in response to tests such as the modified Rozensweig

Picture Frustration Test (Barker and Burton, 1969) or the Spicer-Davis (1980) Social Environmental Picture Frustration (SEPF) Test which allows for free ranging responses within a pre-determined framework, (Spicer, 1980).

The final group of studies, those which are designated preference-based, have the inherent limitation that they typically seek to sample patterns of preference together with reasons for these preferences and that is all. In the main such studies yield global preference patterns but are precluded, by their nature and design, from yielding more intensive data.

Of critical importance to an overall interpretation of this body of research - whether in terms of its ultimate worth or in search of research directions - is an appraisal both of the sample populations used in the studies and the methods of data collection and analysis employed. Table 1 shows clearly that the range in number of subjects is considerable but, perhaps more alarmingly, it demonstrates that a number of research reports have made no explicit statement about sample size. Even Gould and White (1968) offer nothing more specific than the statement

> We considered the residential preferences in Great Britain of pupils about to leave school in the summer of 1965 at twenty three locations (see Fig.1), spanning Falmouth in Cornwall, to Kirkwall in the Orkney Islands (Gould and White, 1968, p.163).

While the locations are shown on the base map (e.g., Bristol, Holyhead), there is no indication as to whether one school was chosen from each location - or whether two or six or twelve were chosen. Moreover, no absolute numbers are given either for individual locations or for the total sample.

The nature of sample populations, as can be deduced from Table 1, also varies widely - and is quite often reported in scant detail, if at all. Some studies (e.g., Gillmor, 1974) stratify samples on a single variable, e.g. school attended, whereas others focus on a particular SES level and a particular group within that SES level (Ladd, 1970 & 1972) or on a particular age group within different SES groups (Spicer, 1974 & 1975).

Few samples incorporate a deliberate balance of the sexes and many reflect a similar lack of concern for a range of age groups. Apart from those studies which utilise a particular age group or grade level (e.g., Blaut et al., 1970; Spicer, 1974 & 1975) or a number of grade levels (e.g., Andrews, 1973; Bartnik & Wall, 1975; Dueck, 1976), age tends to have been disregarded as a factor as have other factors like educational background and nature of occupation (as distinct from socio-economic status of occupation).

In fact, the dominant impression of many samples is that they reflect academic convenience rather than research rigour. While it is explicable and recognizably expedient to utilize samples of college students, university students of geography, psychology or whatever, this places inevitable limitations on the generalizability and usefulness of the findings, limitations which are not always admitted by the researchers themselves. Student samples are more captive and hence more controllable, but their nature and structure almost inevitably is at variance with the broad aims of studies in this area (e.g., Desbarats, 1976; Mackay, 1976).

Skewed and/or haphazard sampling is one problem for studies in this area. A problem of even greater magnitude is inherent in the method/s of data collection and analysis. As was discussed in the specific analyses of the sections of Table 1, a number of methodologies have been used in perception studies of children and adolescents. In essence these may be summarised as encompassing the free recall map used by Lynch (1960) and a host of other studies in the two subsequent decades; preference ranking or rating studies; observation studies where either introspective report and/or participant observation is utilized; general interview schedules; interviews eliciting oral responses to visual stimuli; interviewer initiated oral descriptions; free association tasks in writing; written answers to open-ended questions; essays and drawings; questionnaires; specific tasks relating to an objective base map. As has been intimated at least some of the problems are inherent in the nature of the techniques themselves.

Disenchantment with current methodologies has been voiced before. Both Tuan (1974) and O'Riordan (1971) have expressed doubts about the capacity of questionnaire methods to tap the complexities inherent in environmental perception and behaviour. A similar dubiety led Saarinen (1973b) to explore the possibilities of projective techniques. In a slightly different context, Livesley and Bromley (1973) have argued a case for the methodology of free description on the grounds that such a technique offers greater possibilities than more structured methods of data analysis.

Downs (1981) in his recent thematic analysis of the cognitive mapping area, probably the largest single thrust in environmental perception, reports that the "euphoria of the middle 1960's has now been replaced by a mood of disquiet and skepticism" (Downs, 1981, p.96) suggesting that at best Tuan's (1975) warning that ...

> A time comes ... when a new field must pause in its flight to reconsider the soundness of its foundation and the kind of questions it asks. Perceptual geography has reached such a stage (Tuan, 1975, p.213),

is being heeded. Specifically in the context of cognitive mapping Downs (1981) stat[illegible] that "... we are faced with a series of issues which have been the foci of continuous debate and controversy" (Downs, 1981, p.97). This complex debate argues Downs (1981) revolves around two simple questions:

> Firstly, has cognitive mapping been successful in attaining its goal of understanding the human use of the environment? The consensus seems to be no. This judgement leads directly to the second question: how can cognitive mapping attain this goal? Again, it is convenient to posit a simple dichotomy of answers. One group, the 'empiricists', would append a 'not yet' to the answer to the first question. A second and less optimistic group, the 'humanists', would say 'not in the ways that have been attempted so far' ... (Downs, 1981, p.97).

Oversimplified this dichotomy may be but its essential analysis rings uncomfortably true. It appears that research - at least in the area of environmental perception[1] - seems to have reached a dead-end, a point of no return and a frustrating impasse. Gould and Ola's (1970) specific lament that

> ... our knowledge of the form and structure of geographic space preferences remains weak, and in two areas it is practically non-existent.
>
> Firstly, we have little idea how these mental images are formed, and how they change from childhood to adulthood. Secondly ... there is the problem of specifying the flows of information that impinge upon various people to be processed mentally into individual preferences (Gould & Ola, 1970, p.73)

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[1] Since Downs and Stea (1973) now often termed "environmental cognition" (Downs and Stea, 1973, p.79).

might well be reiterated now over a decade later. In fact the latter half of the seventies has almost seen a shying away from the area, an implicit acceptance of defeat, a failure to face up to the challenge of the exploration beyond the point which has been reached. One cannot but sympathize with Mahemow's (1971) frustration

> ... that the process of environmental perception seems so automatic that it resists ordinary efforts to investigate its nature (Mahemow, 1971, p.82).

Yet it would be disastrous to allow the undoubted frustration to extinguish any attempt to push the frontiers further. There must be other avenues to explore, other strategies to test, even other methodologies to mine. The total area of environmental perception undoubtedly still has enormous potential; there is too much of value to be mined to abandon it.

Olsson (1968), while acknowledging their contribution to knowledge in the area complains that perception studies have made little contribution to geographic theory. Indeed, given that much earlier environmental perception research has, like the psychophysical research, concentrated on a single aspect, it has tended to throw light on the perceptual problem rather than the perceiver. Klein and Schlesinger (1949) published an article entitled "Where is the perceiver in perceptual theory?" Carlson's (1971) article was entitled "Where is the person in personality research?". Similar questions might well be asked about environmental perception research. Where is the person in environmental perception? Where, moreover, is the child? the adolescent?

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THE PERCEPTION OF HAZARDS IN GEOGRAPHICAL EDUCATION: RESEARCH METHODS

Giorgio Valussi

1. The role of geography in hazard education

One of the aims of geographical teaching should surely be a proper education on hazards, especially in countries that are particularly exposed to them. Unfortunately in Italy, where but little scholarly research is carried on in the field of teaching, an aim of this kind is not to be found in any school curricula, nor have the results of any research on the subject yet been published. These pages are thus intended to be an initial attempt at making teachers aware of these problems and at promoting methodological and applicational investigations as it has been made in other countries (Birkenfeld et al 1982). Recurrent natural disasters are normally used by teachers to bring out a sense of human solidarity in their pupils and to promote sympathy, and perhaps concrete relief for populations hit by these calamities. But when a disaster strikes a certain area, people are generally unprepared to cope with it and are often uninformed about the physical forces that produced it; no wonder then if they react fatalistically, or by protesting against the authorities, who are called upon to answer for the causes and the consequences of what happened.

Of all the scholastic subjects geography is doubtless the one most responsible for supplying scientific knowledge of natural hazards. It can teach the basic principles of the processes that cause disasters and can describe the human and economic consequences, which amount to much more than the number of casualties: the pattern of settlement is changed, migratory processes get underway, the economic bases of subsistence and production are undermined, communication systems are seriously upset. The reconstruction that generally follows after a disaster may re-establish the original conditions, but more often it modifies the socio-economic order of the involved areas, according to the directives of public intervention. Furthermore, with reconstruction, prevention and forecast systems are adopted for the purpose of making future disasters less tragic and damaging. Such topics are specifically geographic, even if there is a concourse of other disciplines.

According to the level at which geography is taught, different approaches, methods and techniques can be used that correspond to the pupils' ages, to the type of school and to the socio-economic context If at the level of general geography they can be studied in the specific context of certain geographic regions and brought down to one's own country, where it is easier to address research towards preventive purposes. Since what is taught in school has indirect repercussions on the families of students, and today's students are tomorrow's adults, it is clear that the school in general and the teaching of geography in particular can play a very important role in the formation of a prevention consciousness throughout the society.

Given the need for an educative action in this field and the fact that there is room for treating the topic of hazards in the curriculum, it remains to be seen what teaching strategy should be adopted to obtain the best results. This problem has been taken up by a team in the Geography Institute of the University of Udine, working within the National Group for Didactics of the National Research Council. The team consists of Professors Giorgio Valussi, Franca Battigelli, Alma Bianchetti andGiovanna Bellencin Meneghel.

2. The verification of perception

It was found first of all that an initial test was necessary, i.e. a preliminary verification of the level and kind of perception that students have of hazards, particularly those that are recurrent in their area. Therefore a set of questions was prepared and used experimentally in three classes of the third grade of middle school in the province of Udine, with pupils between thirteen and fifteen years of age. There were 22 pupils from the G. Marconi School in Paderno in Udine, 18 pupils from M. Gortani School in Trasaghis and 17 pupils in I. Nievo School in Buttrio, making a total of 57 pupils. The schools were selected from different geographical areas: an urban area (Udine), an area that was badly hit by the recent earthquake (Tresaghis), and an agricultural/industrial area in the eastern plain (Buttrio).

Despite the smallness of the survey, the analysis of the questionnaires revealed significant points in the pupils' knowledge and perception of hazards; they are summarised below:

- Most of the pupils are unable to distinguish between pure natural hazards and those in which human intervention has some responsibility.
- Pupils' main source of information on the subject is television, followed by newspapers, the school and trailing behind, books and family conversation.
- Among those who had direct experience of a natural disaster (the great majority experienced the 1976 earthquake), the strongest memories are of the visual-sensorial or emotive type. In the zone that was nearest to the quake's epicentre an emotive indifference emerges that betrays a certain inurement to the danger, while the greatest fear was found in the urban area of Udine.
- There is general confusion about the possibilities of forecasting and preventing disasters; on this point the level of information seems to be quite inadequate. Most believe that earthquakes (56% of the pupils), floods, landslips, and volcanic eruptions can be foreseen; a smaller number

of pupils indicated avalanches (19%) and drought. Also as regards the possibilities of prevention, earthquakes are in first place (42%) followed by landslips, floods, avalanches, etc.; 7.5% of the pupils denied that it is possible to prevent such disasters.

- There is great uncertainty about those who should inform and educate the population about hazards. Nearly the same rate is given to scientists, to the school, town authorities, mass-media, the State, the Fire Board and to others.

- There is very little doubt about the school subjects which are best able to provide information on hazards: Geography (89% of the answers) and Natural Sciences (79%), often together.

- The pupils were asked to indicate on two blank maps the distribution of hazards, both world-wide and in Italy. What emerged was a sufficient knowledge of the Italian situation, with significant gaps mostly as regards Central Italy (e.g. the flood in Florence and the earthquake and landslip at Ancona were rarely indicated); furthermore most of Southern Italy, where seismic and volcanic activity were correctly located, was also often indicated as exposed to "drought", probably because of an incorrect interpretation of the term by the pupils. As regards their indications on the world map, the results were negative, with only 7% satisfactory answers (23% scanty, 60% unsatisfactory, 10% blank). The most common gaps concern the belt of volcanoes around the Pacific (whose existence was practically unknown) and the seismic hazard in the Middle East and Mediterranean Africa. Constant precision in indicating the Caribbean area for hurricanes perhaps reveals the formation of mental maps based more on films and literature than on geography. Another mental map shows Africa and the Indian subcontinent as being completely and indiscriminately drought-exposed: this seems due to scant geographical knowledge.

On the whole the test showed a limited perception of hazards by the pupils, who are largely uninformed for lack of a specific educational action. The problem therefore emerges of inserting this topic in Geography courses and of convincing the teachers of the need of it.

It can be asked what methods are most suitable for reaching the goal of a correct hazard education. We propose historical research, interviews and simulation games, methods which can be used singly or as phases of a teaching unit.

3. Research, with particular reference to historical research

(A. Bianchetti)

Before starting a research about hazards it is first of all necessary to keep in mind some fundamental parameters on which the general lines of the work will depend, namely the scale, the chronological factor (diachrony - sinchrony), the near-far factor and, in our case, the age of the pupils (11-14 years) which determines the development of logical and instrumental ability, and therefore the status of the research. This age group is quite unlikely to approach the sources and centres of research with competence, but in this case we are first of all interested in things other than the scholarly level of the results.

The research becomes more and more complex in relation to the problems to be dealt with and the goals to be reached, as these few examples show: a) clarifying the spread and frequency of a given hazard on a world-wide scale; b) comparing the consequence of two similar events in different areas or in the same area; c) determining how a disaster weighs upon a given area, verifying its endemicity and making a critical assessment of the subsequent interventions. These work proposals require different approaches and also have different ranges of research material, both in quantity and in quality. An important role in this regard is played by the near-far factor in time and in space. Generally speaking, for what is "far" we seldom have diversified sources and first-hand material, and there is the obvious impossibility of making on-site investigations; work of this kind necessarily turns out to be book-work, but it has the undeniable utility of acquainting young people with new problems and perspectives. Investigating what is "near" should be a much more intense experience. The perception of a catastrophic event is perhaps even modified by the sense of participation (more so when the event was directly experienced by the students: e.g. in a seismic area like Friuli the idea of a natural disaster is almost immediately synonymous with earthquakes). Furthermore there is a much wider range of sources, and it is possible to do concrete on-site work. For example, a study of drought in the Sahel and of the consequent famines can only be made in Italy using almost exclusively journalistic sources (including the relative photographs and "instant books",) besides the basic scientific background available in geography texts, atlases and encyclopedias. It is to be noted that even "near" events suffer from the same handicaps when they are quite recent.

As a concrete research proposal, we consider particularly stimulating a choice that is "near" enough both in space and in time (so that the involvement of the students will be more likely, different approaches will be possible, and a wide range of sources and documents will be available): "Friuli and the Earthquake (1976)". The title is purposefully general to permit in each situation the sort of research that will appeal to the class's interests. They can, for example, carry out a whole series of parallel investigations, in a regional and in a local scale, or they can concentrate on a local micro-investigation (e.g. "The Earthquake at Gemona", the little town that was the "capital" of the 1976 earthquake). In any case, the investigation has to be broken down into different areas, that will correspond to the problems that emerge as most substantial from the class discussion following the initial test (see par. 2). Work groups will freely form around these problems. After first establishing that the primary goal of the investigation is to show the relationship between the earthquake and the territory it has affected, we need to determine the most significant aspects of the present situation in the light of what has led to its formation: the dia-synchronic approach thus seems to be fundamental both methodologically and didactically. From this standpoint, the first phase of research must be quite historical to furnish the indispensable foundation for the successive work phases in which the current situation is analysed.

In the first phase the necessary source material must therefore be found (the more "local" the investigation is, the more diversified the material will be). Here are some examples: Earthquakes down through the centuries; Earthquakes and habitat evolution (continuity or not in the original locations, the evolution of settlement patterns, consequences for the road network, etc.); Earthquakes and the environment (increase of landslips and mass-movements, the status of the geological faults, changes in the drainage system both above and underground, etc.); The identification of the most highly seismic sites (of special interest on a common level); Earthquakes and reconstruction (the evolution of reconstructing methods of building technology and of relevant legislation); A comparison between the earthquakes of 1928 and 1976 (balance of damages, of preventive measures adopted, their effectiveness and their actual application etc.).

The gathering of information on the history and on the urban and environmental development of the area under study will extend beyond the history books to archive documents (only if they can be easily consulted and understood), family papers and documents, registers and maps, old photos and newspapers. For the physical pattern geological and hydrographical studies and maps, along with physical maps can be consulted. It is quite advisable to talk to scholars and specialists and it is necessary to make first-hand observations on the spot even if the earthquake erased the signs of the past, for a comparison with what is recorded by old documents or photos. Finally it may well be interesting to directly interview the survivors of the 1928 earthquake, and to try to gather information from indirect sources (literary works, folk traditions, etc) which would allow for useful interdisciplinary effort.

It will probably be necessary to have recourse to Udine (the capital of the province) where the libraries and museums are more developed, to find some of the necessary material. For the period after 1976, besides the vast amount of literature and newspapers, the official documents are also available in the offices and bureaux that have organised and supervised relief and reconstruction work. For this phase direct research is indispensable by means of interviews and questionnaires.

4. The Interviews (F. Battigelli)

The interview is in general a didactic device of proven worth in that it is an active and operative moment in the learning process, it supplies first-hand information, and it provides an immersion in reality, a confrontation with events as they are lived and not simply as they are theorized. This device is particularly efficacious when used by students living in areas that have more or less recently been struck by a hazard - in the case of Friuli, the earthquake.

Since the students for whom this research outline is intended are young (11-14 years old), a scale of study is proposed that is sufficiently contained, coinciding with the local government (the Commune in the Italian case).

Who should be interviewed? An investigation of primary importance will be conducted in the Technical Office where there is usually a land-surveyor and, in the larger communes, more specialised professionals (geologists, architects). Other interviews can be conducted in the Population Register Office (for data on natural and migratory movement) and in the Damages Office. Others to interview should be the health officials (the municipal doctor, the health assistant or even the local pharmacist) for information on the wounded, on the danger of infections and epidemics, and on the particular illnesses consequential to the disaster. Also social assistants can provide useful information about the problems of giving help and psychological and material support to the victims of the disaster, and about their behaviour and attitudes. If they are present in the Commune, those military or militarized units should be contacted that in case of disaster are the first to come to the relief of the population: the Carabinieri, the Engineer Corp, and above all the Fire-brigade.

For what concerns social, economic and urbanistic problems in a broad sense, recourse can be done to the municipal offices and bureaux involved (the officers responsible for Planning, Social Services, Public and private House and for

Reconstruction), and for what concerns damage to the environment to the Bureau of Forests.

It is also very useful to meet with local people who, even though they have no specific or official role or responsibility in such matters, are nonetheless precious sources of information about what happened, about the human aspects of the disasters, and how it was experienced and perceived, thanks to their experiences and knowledge of local situations and problems. In particular, the elderly in the community will remember earlier earthquakes, thus giving rise to comparisons with the most recent one.

The groups of interviewers will be formed according to the numbers of interviews planned. A person to be interviewed will be assigned to each group, and the group will be given an interview outline and, if possible, a tape recorder. Specific tasks will then be assigned within each group according to the aptitudes and abilities of each pupil: the interviewer, the recording operator, the report writer, the typist, the illustrator. The time and the modality of the interview will be decided by each group.

The questions to be asked must be previously prepared and formulated in the simplest and clearest way possible, and kept down in number.

An outline of points to be brought up are here proposed, set out according to a logical pattern from which the individual groups can select pertinent questions and adapt them to the specific area of knowledge and competence of each person interviewed.

- Historical precedents for the earthquake (similar and dissimilar elements in the intensity of the earthquakes, in the damage done and in the measures adopted).

- Technical data (warning signals, duration, intensity, extent of the struck area).

- Consequences: - for people (immediate consequences: dead, wounded; subsequent consequences: emigration, mental disturbance, alcoholism, suicide)
  - for settlement (damage to or destruction of buildings, roads etc.; percentage of buildings intact, in need of repair, to be demolished, and completely destroyed).
  - for the economy (damage to or destruction of the production structure, production arrest, loss of jobs, crop and livestock loss, interruption of services)

- Intervention - immediate (organization of assistance, relief for the population, saving of the wounded and recovery of bodies, provision for temporary lodgings, disinfection)
  - medium and long range (settlement or evacuation of the stricken population, economic and social assistance; demolition of condemned buildings, rubble removal; planning, reconstruction of the structues, infrastructures and services for habitation and production; hydrogeological adjustment)

- Forecast and prevention of earthquakes what was done and what could be done (setting up of a seismic teledetection network, antiseismic building laws, efforts to inform and educate the population).

To fill out the interview, other informative material can be gathered, such as registry or survey maps, statistical data and photographs. The text of the interview will thenbe transcribed and completed with a short report on the results. The report will then be read in front of the whole class, and will be followed by a discussion.

This collection of material, together with the results of the discussion, will then be worked up into a final document. Where possible, the statistical data will be illustrated by means of graphs, cartograms, thematic maps, etc. (e.g. trend of the curves of deaths, births, population movements registered before and after the disaster; the indication on maps of buildings damaged or destroyed).

5. The Simulation Game. (G. Bellencin Meneghel)

The initial test that was examined in part 2 is not just intended to determine the level of perception of hazards. A pupil, who in giving his answers, realizes that he is poorly informed and thus uncertain in his knowledge will feel the motivation and the desire to find out more. By means of a simulation game based on a seismic disaster -- of the sort that has always been recurrent in Italy, so much of which is highly seismic -- the objective of better awareness and knowledge of the subject can easily be reached, this also because everyone has some degree of experience of the problem at least indirectly, through the experience of relatives or acquaintances who have been struck. With reference to the Friuli earthquake (1976) in Northern Italy and to the earthquake in 1980 in Southern Italy, the students must:

- come to realize that earthquakes are inevitable and recurrent in seismic areas, and that mankind is still in this regard at Nature's mercy, even if the most advanced measuring techniques can today allow us to make reasonably reliable long-range forecast of seismic events, and much damage can be prevented by observing anti-seismic criteria in building construction;

- understand the breadth of the problems caused by an earthquake and realize the complexity of the actions that it makes necessary, and the scientific research that these actions imply;
- be brought to manifest a civic solidarity;
- be informed about the phenomena that precede (premonitory signs) and accompany an earthquake, and about prevention and emergency measures.

In the preparatory phases of the game, a review of a seismic event that really occurred will serve, not only to motivate the students, but also to introduce the disussion on measures of defence.

Since, among the various modern didactic strategies, we have chosen the simulation game for earthquake analysis and also for the planning of the action to be taken following upon a seismic disaster, we now proceed to an explanation of the rules of the game.

The idea is to simulate an emergency meeting of the Civil Protection Committee, the Special Commissioner, the representatives of the Armed Forces, of the Fire Department, and of local public offices, teams of experts including geologists, engineers, health officials and geographers (1), who discuss the emergency situation and the urgent measures to be taken. The various roles are therefore assigned to small groups of pupils. It will be their task to gather on notecards the information necessary to perform the specific role that has been assigned to them, after first having acquired the basic general notions of the subject (making use of what was learned in the previous phases): the different origins of earthquakes (tectonic, volcanic and deep-focus) areas most frequently hit (ability to locate the major seismic areas on a world map), the recognition of epicentres and hypocentres (explanation of an iso-seismal map), a knowledge of the instruments and scales used to record and measure seismic phenomena (seismograph, seismogram, Mercalli and Richter scales).

In the first phase of the game each group leader presents a plan of action relative to the area of competence of his group. This written plan is hopefully accompanied with maps, tracings and tables. When all the groups have presented their plans the discussion begins, involving everyone and allowing for alternative proposals, for criticisms and suggestions that perhaps have been prepared in advance, since the positions of the various groups can in their broad lines be discerned from the role note-cards. The final decision is in the hands of the Government Commissioner.

In the second phase of the game the class will pretend to be the stricken population, which is not in full agreement with the measures adopted (e.g. evacuation), while the group leaders defend what has been done, with suitable argument. In this phase it may also be understood how the consequences of an earthquake can be aggravated by local environmental, social and economic factors, a comparison between the Friuli earthquake and the one in Southern Italy; in the South the aggravating factors were the difficulty of access to the stricken zones, the extention of the hit area, unfavourable weather and the different attitude and behaviour of the people.

The game is followed by a critical discussion. In this phase it is important to compare the results of the game with the decisions really taken in the emergency situation caused by the actual earthquake, even to review the various measures of intervention. Now the pupils no longer play their roles, but they objectively evaluate, under the teacher's guidance, the results of their work, the verbal and social interaction and the integration within each group, and the concrete contributions made towards increasing social consciousness and creativity.

It is in this phase that the discussion can be opportunely directed towards the problem of defence, that is to say of prevention: this problem has a sociological facet besides its technical, financial and economic aspects. It is known that, if the causes and effects of the phenomenon are understood, it inspires less terror; but together with information it is necessary to spread such practical advices on the safety norms that it is possible to adopt.

According to the scientists gathered together for the Sixth World Conference on Seismic Technology (New Delhi 1977), earthquakes give warning of their own approach considerably in advance, by means of slow modifications of the rocks, which more and more sophisticated measuring instruments (seismographs, magnetometers, etc.) can detect by continuous observations over a period of years in as dense a network of stations as possible. The fact is that as yet only a few zones are under observation (there is also the problem of money); furthermore the problem is still unsolved as to how to make short-range predictions of the time and the intensity of a quake, in order to opportunely gives the alarm. Direct observation (physiological premonitory signals in animals, lowering of the water level in wells, light phenomena and slight tremors that precede many violent quakes) only recently have begun to be taken into serious onsideration by the scientific world.

Practical advice concerns what to do in those few moments that pass between the first symptoms and the earthquake (among other things: take cover under braced arches, or run out into the open, but away from narrow streets and from high voltage pylons, if indoors, take cover under a table, put out fires, switch off the electric current, etc.).

During the Technical Applications lessons an elementary seismometer could be constructed to help achieve the operative objectives.

By means of a final written test it will be possible to measure the progress made as regards basic notions, information, and methods of work and of social consciousness, in the light of the learning objectives that were originally set.

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METHODS OF RESEARCHING THE USE OF VISUAL AIDS IN THE TEACHING OF GEOGRAPHY.

Agustin Hernando

Introduction

There are several reasons for the use of visual aids in the teaching of geography. First, the history of geography represents two different ways of viewing geography. On one hand there are those who see geography as a description of the earth, classifying information through the use of verbal language. This tendency is the most developed at present, and has produced a larger number of studies and has a larger following.

On the other hand there are those who see geography as consisting of a picture of the earth in the original and etymological sense of the term in ancient Greek and whose studies are expressed through the use of graphic language.

The contributions of such authors as Eratostenes, Ptolemy, Mercator, Ortelius and the works of cartographers, have greatly advanced our knowledge of the earth's image, its countryside and what can be found on its surface. Literary description and graphic description are thus two ways of getting a better understanding of the earth's surface.

A second reason is based on the idea of transmitting educational messages in an illustrated form. The pursuit of realism and the use of intuitive methods are based on this alternative to the verbal method which yields the advantages which can be gained by using the sense of sight in certain learning situations. Comenius is an early representative of this tendency with such followers as Pestalozzi who caused great repercussions with his methods of teaching geography. Technological developments, despite their weak effect on teaching and learning situations, have favoured the use and spread of visual resources. The publicity slogan, "Don't say what it's like. Show it!" is an argument in favour of those who support the use of visual aids and intuitive methods.

Apart from these two reasons, other factors have been mentioned by supporters as contributing to the selection and use of visual aids. The factors which have been highlighted by teachers are those of pupil motivation, interest stimulation, wider experience and increased validity of work when visual aids are introduced to back up the verbal terms and concepts. Other factors relate to the development of the pupils skills. The use of visual stimuli, according to Balchin (1972), is a relevant contribution to the pupil's education. A final less evident argument relates to the necessity of meeting the needs of the student since he increasingly acquires information through a graphic medium. This is one of the greatest challenges to present day education.

In this study the term "visual aid" applies to any geographical message or information which is presented in graphic form. The complexity of these situations is such that, despite studies carried out, we know very little about them. The other aspect of the title, "methods of research", is used to describe processes carried out which have the aim of answering the many questions which arise out of assessing the value of visual aids. Three major contributions to this research are presented below; descriptive research, which has been extensive; theoretical reflections, a recently opened line of research which aims at a clearer understanding of the nature of visual aids and their function as a method of communication. The third contribution is that of experimental research which has produced fewer studies than descriptive research but which has enabled us to get to the bottom of certain questions. To illustrate this research some published works have been selected and are shown in tables. Although the approach is synthetic, some

TABLE 1 RESEARCH INTO THE USE OF VISUAL AIDS

CHARACTERISTICS	OBJECTIVES PURSUED	METHODS OF OBTAINING INFORMATION	RESULTS
Early Studies			
Descriptive research. Mixture of the empirical and the intuitive, together with value judgements. To inform and aid teachers. Prescriptive.	Search for data and facts with the aim of improvement in teaching methods. Share experiences and new resources. Offer orientations and stimuli in the use of the visual aid.	Personal experience. Reflection. Few bibliographical supports. Observation.	Advice, suggestions, methods to be reproduced or imitated according to the prestige of the author. Knowledge about advantages and methods in the use of visual aids. Inventories, classifications, descriptions of apparatus and their functions.
In Search of a Theory			
The use of borrowed functional models. Principally cartographic. Elaboration of principles.	Deeper understanding of the nature of the map. Discovery of its attributes. The understanding graphic language with the help of the theories of communication and semiology.	Adaptation of models and analogies of other fields of knowledge. Analysis and evaluation of those. Reflections on the components of graphics and the relationships which exist between reality, the author and the reader.	Models, concepts, ideas. Precision in vocabulary. Discovery of relationship between the elements which exist in graphic communication. Research to improve design and production. Critical reflection. Posing of questions.
In Search of Causal Relationships			
To know and identify the variables which affect teaching-learning situations in relation to visual aids. Experiments. The learner as a variable dependent on the visual aid.	To know the advantages of using visual aids. Attempt to discover the pupils difficulties. Identify the reading process of the visual aid.	Experimental. Based on a problem in the subject. Search of supporting bibliographies. Questionnaires, test. Analysis of data.	Knowledge of a certain degree of correlation between variables. Conclusions with timid generalizations. Steps, hierarchies, sequences, methods of reading and interpreting the visual aid. Hierarchical difficulties in the use of the pupils skills.

of the questions are posed which may direct the work of researchers in the future.

Descriptive research

The majority of studies in bibliographic indices (Lukehurst, Graves, 1972 Saveland, Pannel, 1975) which refer to the use of visual aids concern descriptive research. They are short articles which seek to popularise the use of visual aids, and to stimulate readers to adopt them. In the case of some authors, and in a restricted sense, these studies are not really research since facts are mixed with weakly argued opinions. However, we cannot undervalue them since they are the first to search for empirical data.

The bibliographic indices mentioned tend to include articles such as those on the use of maps and visual methods in which they make an inventory of existing studies which have appeared in teaching magazines. Thus, nearly all of the books on the Teaching of Geography (Unesco, 1965, Long, Roberson, 1966, Gospill, 1973, Bailey, 1974) aimed principally at practising teachers, include chapters in which arguments are presented in favour of using maps and photographs together with examples of how to use them. Until recently no research had been completed which aimed at evaluating the history and evolution of visual aids, the most important studies, their authors, the spread of certain resources and strategies etc. At the same time, the surveys carried out (HMSO 1974) do not reveal in depth the use of visual aids by teachers since these questions refer fundamentally to the availability of visual resources. One may decide that the language used in teaching and learning situations is predominantly verbal language and that visual aids are still only used minimally. This is surprising when textbooks (Wright, 1979) external and examinations are analysed; the exercises in these give great weight to visual exercises (Briggs et al 1979). Thus, there are indications in relation to the teaching of geography which lead us to expect progress in the use of visual aids. Despite the importance played by verbal language, oral and written, further research into this has not been extensive. The use of visual aids has stimulated more interest among teachers, even before the foundation of the British Geographical Association in 1893. The Geographical Association stimulated contacts and created channels of information such as the magazine "Geographical Teacher", in which articles concerning the use of visual aids appeared in the first issue (Andrews, 1901). What are the authors of descriptive studies pursuing? What questions are they posing? How do they obtain their information? The answer to these questions are quite difficult and complex since this information is not frequently included in the work. Without doubt the first objective is to stimulate the use of visual aids, giving information which could be useful to teachers. To do this, and in a persuasive way, they put forward their experiences, explain and describe in detail the instruments and methods which will help their colleagues' work. Technical developments, from the development of the 35mm photograph to those carried out by Landsat, have been documented in magazines to be later incorporated in manuals. The use of visual aids is stimulated by showing the great advantages they can bring about and highlighting the successes achieved. To this is added examples of usage which, on occasion, tends to take up the largest part of the work. Descriptions and classifications of the apparatus and the characteristics of the visual aids relate to a different type of study which aims at familiarisation with and management of new instruments (table II).

Rather than admit the complementarity of verbal language and visual presentations in learning situations, these studies react to the past in which

TABLE II EXAMPLES OF INITIAL RESEARCH ON THE USE OF THE VISUAL AID

AUTHOR	AIMS	SOURCE OF INFORMATION	RESULTS
Cons (1946)	To show ideas which stimulate the use of visual aids.	Personal experience. thought and bibliography.	Stimuli, advice for use and selection of visual aids. Synthesis of previous works.
Dillon (1965)	Stimulate interest in the use of visual aids.	Personal experience. thought and bibliography.	Inventory of Resources. Arguments in favour of the use of visual aids Description of apparatus.
Gopsill (1973)	To inform about the use of visual resources. Stimulate and suggest with examples.	Personal experience, thought and bibliography.	Description of apparatus, visual resources and methods of use.
Halverson (n.d.)	Ideas to stimulate and orientate adequate use of the photograph.	Personal experience, thought and bibliography.	Classification of visual aids. Suggestions for use. Inventory of publishers Bibliography.
Long, Roberson (1966)	Show and highlight the advantages of the visual aid. Supply examples of use.	Personal experience, thought and bibliography.	Suggestions for the use of maps and photographs.

education was based on verbalism and memorising, on the accumulation of names, dates and facts which constituted geographical information. With the use of visual aids they aim at an education which is more lucid, pleasurable and relevant, thanks to the use of modern instruments and to such resources as topographical maps. With the spread of visual resources, they aim at creating a different image of the teaching of geography, by-passing those aspects which are most criticised and looking for more valid alternatives. Photographic aids, increasingly perfected, help in this task, allowing reality to enter the classroom, showing landscapes which allow the indirect observation of areas and phenomena which until then could only be imagined. The use of the map as an instrument of localisation, distribution and expression of the earth's surface has also stimulated some academic geographers. They also suggest other skills such as observation, thereby further stimulating the use of visual aids in the teaching of the subject.

The process most used in such works is description. Description of experiences, sequences, instruments, reactions of the pupils. The "I do it like this and get good results" attitude is the most usual way of expressing such work. Only in more recent studies have the problems of using visual aids been brought to light and other methodologies been developed to solve them. The facts which are put forward in these studies we believe come from personal reflection, experience and support from other authors with similar experiences, although this is not stated.

To summarise, the studies mentioned here reflect the initial stage of research. They are the fruit of concern for empirical data with the aim of improving the task of teaching, and quite on the margin of scientific enquiry. They describe experiences and new methods which appear on the market. However, they lack searching questions and avoid the problems which the use of visual aids presents. A fair assessment of these studies must place them in the context of then current research in education, in the context of the current state of the teaching of geography or of geography itself. The progressive and successful use of visual aids is a great result of such efforts.

Theoretical considerations: Towards an understanding of the nature of visual aids

Other researchers related to geography have been concerned with gaining a clearer understanding of this kind of research; they have carried out studies, the results of which imply the use of visual aids. Among studies related to geography is the work carried out by a group of cartographers who have dedicated themselves to understanding the nature of the map (Board, 1976; Ratasky, 1976 Robinson and Petchenik, 1976, Guelke, 1977, 1981). Other authors, who up to now have been less prominent, are the psychologists who have concerned themselves with the processes of the acquisition and treatment of information gained from visual stimuli (Vernon, 1945-46, Rowher, 1970). Others from the more diverse fields of computing, communications, semiology - all of which are less institutionalised have produced studies which are relevant to visual aids and to the functional process of graphic communication (Bertin, 1967, Bowman, 1968). From this perspective, visual aids can be regarded as a separate entity and as an element in the communication process. In the first case, visual aids used by geographers possess characteristics derived from their nature and attributes. It is a graphic resource selected for the information it possesses and endowed with a uniqueness inaccessible to other methods. Thus, the visual aid is selected and used in the context to which it is related, thanks to the message it will be able to transfer to those who are to understand it. For this reason, the value of the visual aid will always be subordinate to the information it conveys and also to the success with which it is able to convey its message. If the conveyance of information takes on major importance, success in learning situations aimed at specific objectives and pupils will follow. (Dwyer, 1978).

The studies which have been cited as examples of descriptive research also include tipologies of visual aids. These tend to rely on external or material criteria. Careful study of various types of visual aids reveals a great deal of confusion in the terminology used to describe these. Examples will be given below of the main theoretical studies and their methods in relation to topological visual aids; the map, the photograph, the graph (Table III).

The Map

There are numerous studies in the field of cartography by authors from a variety of countries. Most of them have appeared in the last fifteen years. As opposed to traditional publications such as manuals which aim at improving cartographic production and in guiding the learner in the interpretation of maps, these theoretical publications present the map from a different point of view - the elements from which it is made up, its language and the relationship between the reality of the earth's surface and the notions acquired by the map-reader. The work edited by C. Board (1976) highlights the nature of such works and the aim they pursue. Four books which clearly show the efforts of cartographers along these lines are commented upon below. The first is that written by A. H. Robinson and B. Bartz-Petchenik (1976). Along the same lines although not going into the subject in such depth but with rather more bibliography is J. S. Keates' work (1982). Both of these studies represent a synthesis of the map, its language, the process of map-making and map-reading. They are the most extensive, in-depth studies to date. The other two works deal with selected articles, published or other-

TABLE III EXAMPLES OF RESEARCH AIMED AT A BETTER UNDERSTANDING OF THE CARTOGRAPHIC VISUAL AID

AUTHORS	OBJECTIVES	SOURCE OF INFORMATION OBTAINED	RESULTS
Board (1978)	Formulation of applications of the results of theoretical cartography. Stimulation of discussion.	Analysis and evaluation of other authors ideas. Discussion and criticism.	Suggestions on method of applying theory
Morrison (1978)	To study the contributions of two psychologists and their use in the understanding and improving of the communicative process of cartography.	Analysis of the contributions of Piaget and Bruner.	Propose questions. Suggest possible theoretical and practical research.
Muehrchke (1981)	Highlight the changes experienced in the use of maps by cartographers.	Analysis and discussion of the ideas of other authors. Thought.	Decreasing tendency by cartographer to use maps. Gives arguments as well as solutions on how to improve relations.
Ratasky (1976)	Highlight the informative character of the map and its importance in the process of communication. Study the research in cartography.	Reflection and personal experience.	Communicative models. Structure and elements of cartography. Suggestions of subject for further research.
Robinson & Bartz-Petchenik (1976)	Attempt to understand the nature and uniqueness of the map, the components it is made up of and its function in the communications system.	Bibliography, reflection, discussion, criticism of ideas.	An essay aimed at diverse subjects. Reflection and criticism of unedited aspects of the production and use of the map. A framework for future research on this subject. Terminology.

wise, dealing with the same subject. They are two monographic issues of the magazine "Cartographica" (no 19, 1977 and no. 27, 1981). The first issue is a summary of articles which deal with the map and its attributes. In this issue some of the first theoretical formulations about maps, cartographic language, the communicative function, relationship with reality etc. are gathered together. The second issue presents us with work by representative authors in which the most recent studies in this field are analysed, as is the relationship between cartography and geography, progress in map production using computers etc. These are all articles in which ideas and information presented by other authors are processed, their work discussed, applications suggested and new perspectives opened. The bibliography used comes from sources little known to geographers and cartographers. They borrow analogies and models which they apply to the map (Board, 1978). Communicative models, language, vowels consonants, grammar, syntax are some of the themes explored. The approach tends to be historical, global, structural, aiming at covering the elements and components from which it is made up. The models, as time passes, become continually more complex and made up of a greater number of components. At the same time, each component disintegrates to produce new ways and sequences. For example, in the process of map-reading there are two distinguishable steps, reading and interpretation; thirdly, reading, fourthly analysis and then interpretation.. and so on (Board, 1978). Without doubt the greatest study is the understanding of the map as a means of communication and the narrow relationship which exists, of a functional nature, between the many steps in a long process which begins with the reality of the earth's surface and which should end in the mental image of reality in the reader's mind (Ratasky, 1976). This research presents many questions which in turn suggest new subjects for research.

On the educational side, efforts have led to the production of articles dedicated to map-reading, the sequence of concepts, the overcoming of difficulties etc. They are the syntheses following descriptive work which include personal experiences (Schools Council, Geography Committee 1979).

The Photograph

The spectacular technological developments in photography explains its slow penetration in all teaching situations, both in text books and in the classroom. The evolution of text books is an example of the interest shown in illustrations, principally photographs. In such books information is expressed in two forms of language; verbal and graphic. Although at the moment the situation has been reversed and the dominant position is taken by the photograph, the literary text being given second place, hardly any research has been carried out to assess the benefits of this educationally. The relationship between text and visual aids is changing not only in terms of quantity but also in quality thanks to an increasingly better use of visual aids. The written text suggests questions, guides the reader and stimulates the students' diverse capabilities. However, there is still a lot to do and many questions remain unanswered. Use, reading, usefulness, adequacy and relevance are questions which have given rise not only to little research but also to little thought. Little use of studies from other sources concerning the density of information, the motivating capacity, the realism, the manipulation, the functions of photographs etc. has been made (Williams, 1963). We are still moving in a climate of intuition. The film for example, has hardly sparked any interest up to date. The lack of arguments and empirical data is evident (Jacquinot, 1977).

The Graph

Another type of visual aid used in the teaching of geography is the graph. In the analysis of the variety of illustrations which appear in text books, apart from maps and photographs, we can clearly identify three types of graphics. Firstly, artistic drawings, block diagrams, landscapes, cartoons; secondly, quantitative graphs, the principal characteristic of which is the precision in the expression of facts; and thirdly, diagrams which aim at communicating, in the simplest way, the elements which bring together concepts, facts and ideas.

The most important studies are from graphic designers such as Bertin (1967) (1977), Bonin (1975) which in turn popularise studies into semiology and the laws of perception. Their work is the fruit of lengthy experience in the education and practice of graphic design, the posing of the problems of graphic expression, reflection and the discovery of alternative solutions, such as the data matrix of Bertin (1977). Their work is mainly aimed at graphic designers, offering useful advice and orientation. Their main proposals are not very explicit with reference to the variables of graphic design and norms for its use.

The other end of graphic production, that of reading and interpreting, has hardly been studied by geographers. Experimental work in which visual illiteracy is clearly shown (Vernon, 1945-46), although carried out in a different context to the present day one, is still valid.

Experimental Research: In search of casual relationships

The experimental research methods carried out by psychologists and educationists have influenced the teaching of geography. The theses produced are mainly in line with this scheme of research. At the same time they are manifestations of the influence of positivist methods which are predominant in the world of scientific research. The search for laws, correlations, the causes which explain the results of the use of visual aids is another path followed by a great number of researchers. The use of experimental methods allows us to obtain empirical data of different natures which confirm or refute the intuitions which until now have been accepted by the majority of users of visual aids in the teaching of geography.

The first research followed the scheme, "use of visual aids - more successful learning" (Table IV). It is the search for causal relations between a new stimulus, the visual aid, and the consequences, the acquisition of concepts, information etc. Despite the concentration on visual stimuli, the results do not show notable differences between this method and other learning methods. The insecurity of the researchers, as well as the lack of confidence in this method, is highlighted in their interpretation of conclusions and results. For the majority of authors, such conclusions are only provisional and suggest the necessity to use a greater number of subjects in experiments to discover relationships between variables which are not controlled nor allowed for in the experiments. Further, it is necessary to mention the criticisms of positivist research which seeks narrow cause-effect relationship (Bartlett, 1980), and the search for alternative methodologies among educational researchers such as the proposal for an ecological method. That is to say, the integration of the visual variable with other stimuli in the context of the learning situations. Although as yet the affective reactions of the receiver of the stimuli have not yet been explored, it is assumed that the idealistic and humanistic currents geography at present are likely to stimulate interest in this area.

The approach generally used in such experiments consists in the adoption of a combined deductive and inductive method. It starts with an idea or problem such as "What does a 12 year old read in a visual aid? What strategy do they use to interpret visual information?" etc. A questionnaire is formulated, on occasions, to be distributed in two phases; first a pilot

TABLE IV EXAMPLES OF EXPERIMENTAL RESEARCH

AUTHOR	OBJECTIVES	SOURCE OF INFORMATION OBTAINED	RESULTS
Laner (1956-57)	Relationships between visual material and learning. Use of the visual aid by the pupil.	Posing subject-problems Literary revision. Questionnaire, test. Interpretation of results.	Attraction of the pupil to this method of learning No significant data in the visual aid-learning relationship. Pupil characteristic as the most important variable.
Dutton (1973)	To discover the characteristics and attributes of concrete and abstract graphics in the learning situation. Relationship learning-visual aid.	Outline subject. Literary revision. Questionnaire, test Interpretation of results.	Superior usefulness of certain graphics over others. No evidence of results in learning. Resulting implications with suggestions for use of visual aids in class and books.
Long (1961)	To obtain data on the reading of photographic visual aids in learning situations.	Outline subject. Literary revision. Questionnaire, test Interpretation of results.	Orientation about how and what the pupil reads in photographs. Formulation of explanations.
Sandford (1980)	To obtain data about the reading of atlas maps and to search for explanations.	Outline subject. Questionnaire, test. Interpretation of results.	Difficulties arising in the reading and interpretation of atlas maps.
Bayliss, Renwick (1973)	To know what pupils of 7-11 perceive when presented with photographs in diverse contexts.	Outline subject. Test. Comparative analysis of facts. Interpretation.	The need to guide the study of photographs. The most appropriate sequence for successful learning is suggested.

survey to test the affectiveness of the instrument, and secondly a main survey with a modified questionnaire to obtain the data required. The visual media is chosen, the number of pupils, their characteristics, situation etc. The results obtained through questionnaires or tests are afterwards quantitavely, graphically and qualitatively analysed. And from all this, conclusions are drawn. Generalisations are not usually made; owing to the limitations of the research model, which is always unique and specific to the context. Observations of the reactions of the pupils does not attract the researchers' attention a great deal.

The results of experimental research are difficult to evaluate. They bring forward facts, orientate the use of visual aids to discover difficulties, aid in the selection of graphics, stimulate experimentation in other contexts etc. They also pose new questions and doubts. Theoretical research provides standards for experimental research since they offer hypotheses which require proof. Psychologists such as Bruner (1966) suggest the need to use visual aids for learning. Other psychologists such as Gagné (1977), by giving such diverse results of learning experiments increase the difficulties in evaluating the successfulness of visual aids. The black box of the receiver, the internal processes of the pupil's mind after experiencing visual aids are unknown. These are some of the key questions which require further experimentation to obtain a clearer understanding.

Future tendencies

Following these observations, an attempts will be made to give some conclusions and highlight some lines of action for the future. The growing consciencciousness and sensitivity which exists among teachers and the professionalism orientated towards success allows the prediction of great progress in the next few years. Access to and consultation of resource in associated fields is increasingly evident. Equally the present post-positivist stage, past experiences and its analysis suggests that researchers take a more responsible attitude to future work. The end of a stage characterised by the search for data without too much concern for supporting methods and arguments has been reached. The subsequent steps are difficult to predict. Nevertheless, four lines of action may be indicated.

Firstly, a careful study of what is to be learned is needed, i.e. the nature of geography in education. Which of its messages can be sketched graphically? Thought about space, the making of spatial decisions need graphic codification.

Secondly, a better understanding is required of graphic resources. Their advantages, attributes and limitations, are something we know little about.

Thirdly, the mental processes of the learners in codifying, treating and expressing graphic information must be considered.

Finally, the activity of formulating objectives and adapting them in order to use visual aids and succeed in the educational enterprise. It is the difficult task of successfully joining together learning objectives, activities using visual aids as opposed to alternative designs, in order to obtain particular learning results.

These general lines of action include more concrete aspects which require investigation. These are:

(a) A visual aid is a resource within a context, given that in the teaching situationconsideration must be given to other informative and affective stimuli. The context is the key. The dialectic relationships with the subject to be taught must be revealed.

(b) The affective dimension of the visual aid, the values it possesses and transmits, the sensations which it generates are as yet, an unknown aspect. From having an ornamental function in learning situations it has changed to perform an informative function. This is leading to the development of skills and strategies necessary to its perception and use.

With respect to research methods, theoretical formulations are needed which will lead to activities which will substantiate methods used.

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RESEARCH METHODS IN EVALUATING THE USE OF MEDIA IN GEOGRAPHICAL EDUCATION

Hartwig Haubrich

Introduction

There are so many media and research approaches for geography teaching that the author is forced to concentrate on some aspects of the topic. The following areas will be covered:

1. The need to clarify the philosophy of learning through media. 2. Taking a decision about the research field. 3. Concentrating on a small but fruitful question. 4. Building only a few hypotheses. 5 Determining sufficient test groups. 6. Deciding on the data to collect and the methods to apply. 7. Creating a logical research design. The summary will try to discuss different research approaches or "states of the art".

1. The need to clarify one's philosophy of learning through media.

The philosophical and pedagogical basis of media didactics can be very different. The one chosen determines the research methods and often the research results.

It is therefore necessary to think about the philosophy of learning through media as will now be done.

figure 1 : Learning through media

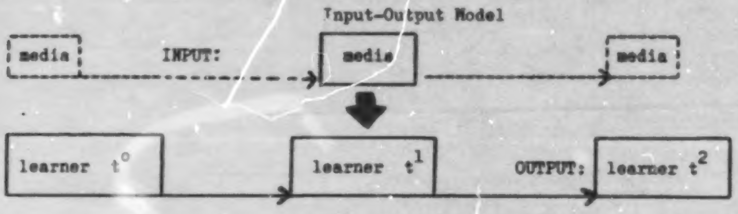

figure 2 : Learning through media

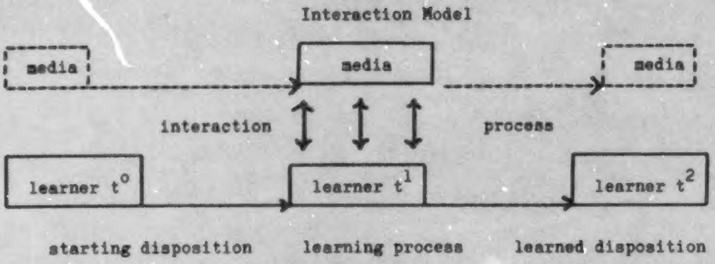
Interaction Model
media
media
media
interaction
process
learner t^0
learner t^1
learner t^2
starting disposition
learning process
learned disposition

Figure 1 and 2 show two different models of learning through media - the Input-Output Model and the Interaction Model. Some basic research questions need an answer which may be obtained from the input, output and interaction process of learning through media.

What about the input? Is is the medium with its information without the learner being directly involved? If so, the learner is only the object not the subject of the learning process. His behaviour is passive, receptive, reaction and not autonomous, creative and active. Such an understanding of the effect of media can be described as mechanistic, positivistic and behaviouristic. This philosophy underlies much media-didactical research work.

If the learner is involved with the media, the learner is not a pure product of media influence but a co-producer of the learning process and output. Given this philosophy, it is more difficult to get homogeneous and constant learner groups for comparison. The media impact is different because of the relatively autonomous learner behaviour.

What about the understanding of the interaction or learning process and its position in the research work? Very often media researches describe the input by means of a pretest of the learners, the prescription of the media work in the classroom and the output by post-tests, but what really is going on in the classroom remains a "black box". Therefore additional recording of the learning and teaching process itself is a necessary instrument for media research.

What about the output? The difference between post-test and pre-test, i.e. knowledge-, skills- and value-tests, is used to describe the change of the learner behaviour, i.e. the teaching effect. But what is measurable? Knowledge and skills are, but not, or only partly, values and attitudes. We know that mental maps are very interesting but are they a real mirror of the map in mind? Do pre- and post-tests only measure single factors and not the most important educational effects?

Much remains to be found out. Some people say, for example, that cruelty in television does not make children cruel, i.e. they do not believe in the media impact; but there also are very many powerful groups such as politicians and advertising firms who pay a lot of money for every minute of television time and believe very strongly in the media influence. What is really going on in the process of learning through media will remain a question for experts of geographical didactics for a long time.

2. Taking a decision about the research field

media analysis

interaction analysis

impact analysis

learner analysis

figure 3. fields of media research

The main goals of media-didactical research are:

1. a media analysis, that is an analysis of the content or information structure and of the form or instrumental structure of the media,

2. an interaction analysis, that is an analysis of the learning process or use of media by the learner.

3. an impact analysis, that means an analysis of the influence or effect of media on the recipients.

4. a learner analysis which is needed for an impact and an interaction analysis but not for a content analysis.

These goals have the following common functions:

1. to optimize the media quality in order to sharpen up the
   - information or subject structure and to make for better understanding by the recipient

2. to optimize the learning activities through media

3. to choose the right media for the right subject content

4. to make the recipients better able to use media

3. Concentrating on a small but fruitful question

One of the most important conditions for a successful media research project for geographical education is to have a good clear question. There have been many publications in geographical didactics reporting on research tasks such as:

1. providing a path for learning through programmed learning in geographical education
2. developing computer assisted learning programs for geographical education,
3. analysing the content of geographical texts
4. evaluating media for geographical education by teachers,
5. analysing foreign people's images as portrayed by the media,
6. developing individualised programmes for the study of geography
7. describing the relationship between language and geographical education
8. finding out the utility of sketches for geographical education
9. revising multiple-choice tests in geographical education
10. comparing teacher-oriented learning with programmed learning
11. assessing television as a source of geographical knowledge for students
12. finding out the effect of educational broadcasting on geographical education
13. discovering the impact of educational television with and without ancillary material
14. evaluating students' understanding of satellite and aerial pictures in geographical education
15. assessing the effect of work sheets
16. discovering how students read various atlas maps

This selection shows that there are many important research questions but also that the questions are mostly overloaded. Nowadays experts in geographical education know that their research goals should not be too broad. It is easier to analyse small tasks and to get scientifically exact answers to simple than to very complex questions. Further the selected research should extend on existing research work in order to accumulate and build up a body of knowledge on geographical didactics.

4. Building only a few hypotheses.

Many hypotheses need a great deal of data, if the research work is to be scientifically valid. Here are examples of hypotheses on the use of aerial photos by students:

hypothesis 1 :	Students of schooltype A learn more quickly to interpret an aerial photo than students of schooltype B.
hypothesis 2 :	Boys learn more than girls through aerial photos.
hypothesis 3 :	Students who have teachers with more than 15 years experience, learn less in using aerial photos than students with teachers with less than 15 years' experience.
hypothesis 4 :	Students who have had experience of interpreting ground level photographs will learn more through analyzing aerial photographs than students without such experiences.

To verify or falsify these few and relatively simple hypotheses it is necessary to have a great deal of data and test groups as it will be shown in the following section.

5. Determining sufficient test groups

For the above hypotheses it is necessary to have data about

(a) students with experience of ground level photo-interpretation

(b) students without experience of ground level photo-interpretation

(c) students with teachers of more than 15 years' experience

(d) students with teachers of less than 15 years' experience

(e) female and male students

(f) students of schooltype A and schooltype B

These students groups in various combinations are shown in figure 4.

If each of the 16 subpopulations has 25 students, the whole sample group has to have at least 400 students. To obtain data from such a sample involves much organization and is costly. The tests need to be administered by qualified staff.

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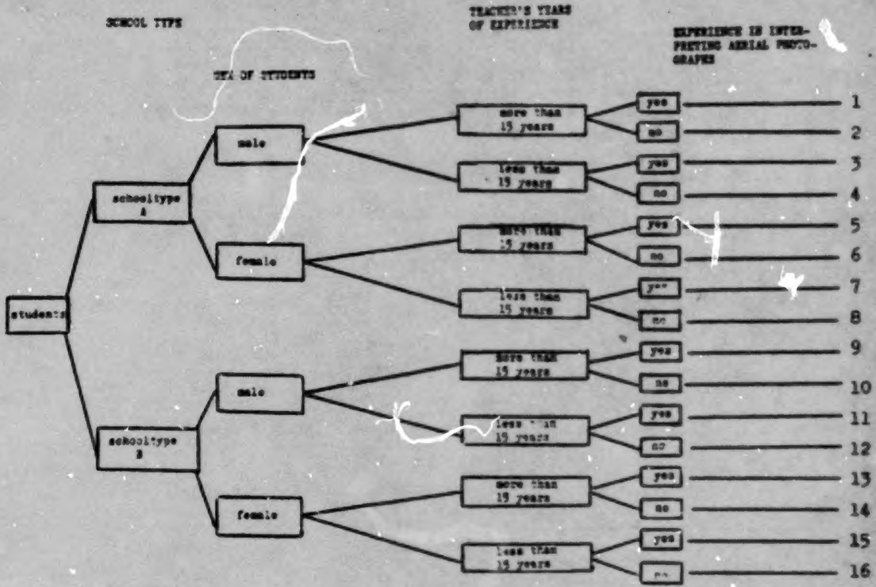

SCHOOL TYPE
SEX OF STUDENTS
TEACHER'S YEARS OF EXPERIENCE
EXPERIENCE IN INTERPRETING AERIAL PHOTOGRAPHS
students
schooltype A
schooltype B
male
female
male
female
more than 15 years
less than 15 years
more than 15 years
less than 15 years
more than 15 years
less than 15 years
more than 15 years
less than 15 years
yes
no
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16

Figure 4 : Determination of test groups according to the hypotheses (similar to Heilig 1982) to be tested.

6. Deciding on the data to collect and the method to apply.

There are many models and common structures of methods and data such as rating scales, standardized batteries of tests of concentration, intelligence, knowledge, skills, behaviour and personality. These should be used if possible, because only then is it possible to compare the results with other research results. It could be of great benefit if the Commission on Geographical Education of the IGU could standardize the basic research methods in order to get internationally comparable research results.

Of course each research goal will need in addition to the basic methods and data, specific ones. It makes a difference according to whether one wants to work out a content analysis, an interaction process analysis or an impact analysis of geographical media.

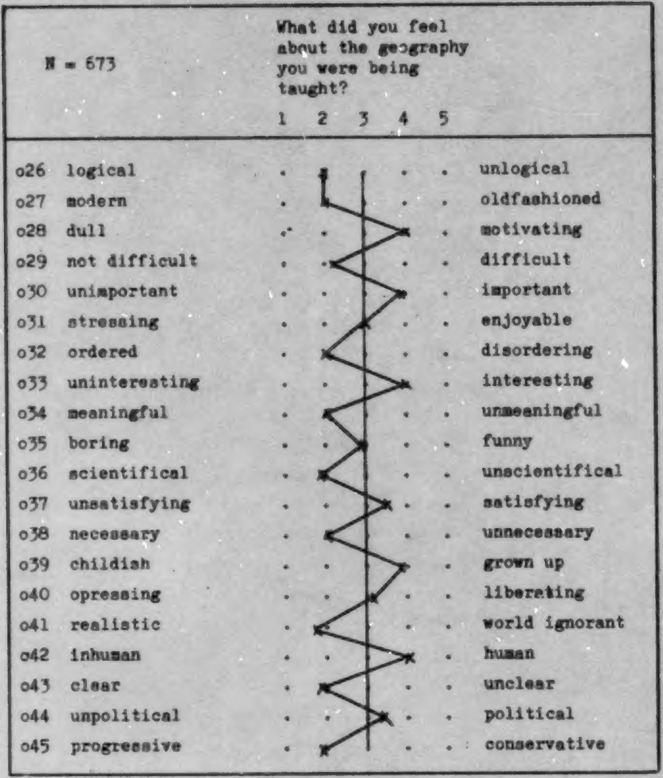
6.1 . Learner analysis:

The goal of analysing learning gains and learning processes requires a description of the learner's characteristics as shown in the following table 1

Table 1: Selection of data to describe the learner structure

Common data:	1. age
	2. sex
	3. regional origin (rural, urban, ...)
	4. social origin (father's/mother's profession)
	5. cultural origin (nationality, religion ...)
	6. intelligence (intelligence quotient)
Special data:	7. marks (in the subject geography)
	8. behaviour (pre/post-testing of attitudes for against the subject geography)
	9. geographical knowledge pre and post-test related to the new media information
	10. geographical skills pre and post-test related to the new media information
	11. geographical values pre and post-test related to the new media information

Figure 5. The Evaluation of geography teaching by students - an example of a test using the semantic differential technique.



Evaluation report of "Tatort Thein" from Haubrich, H., Nolzen, H.u.a. by Hedda Jungfer in : Raumwissenschaftliches Curriculum-Forschungsprojekt/ Materialien .... Band 13, Munchen 1979

6.2 Impact analysis

An impact analysis always measures the dependent variable: "impact", by a pre- and post-test of knowledge, skills, values and attitudes - once before, and once, twice or three times after the students media work. The differences between the data before and after measures the "impact".

In order to get an exact didactical experiment it is necessary to have "ex ante" i.e. before the experimental activities

a. hypothesis, i.e. a prediction of the media impact

b. a test group for the intended media impact for learning through the media A,

c. a test group for learning without the media A, or with the media B for comparison purposes.

Only these conditions enable the comparison of both test groups and the verification of falsification of the predicted hypotheses.

Figure 6. Experimental approach of an impact analysis

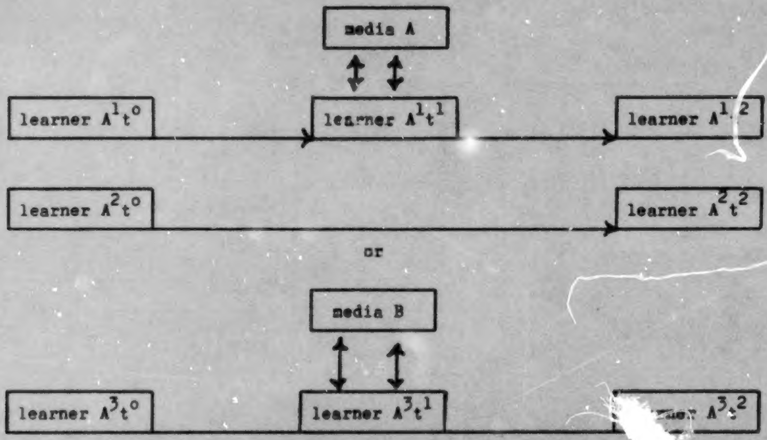
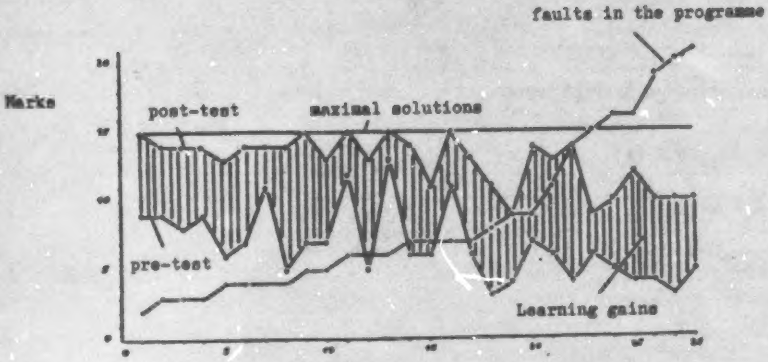

media A
learner A^1t^o
learner A^1t^1
learner $A^{1}t^{2}$
learner A^2t^o
learner A^2t^2
or
media B
learner A^3t^o
learner A^3t^1
learner A^3t^2

Figure 7: Impact measuring (example)

Pre- and post-knowledge test



Numbers of frames and test terms

Haubrich, H, Halfmann U. Testergebnisse eine Programmierungsversuchs Von der Erde zum Mond "Bad Heilbrunn 1969)

Figure 8: Evaluation of photos by students (example)

Picture	Mean	Good				Bad
p [illegible]	x=2.3	1	2	3	4	5
p 2	2.5	1	2	3	4	5
p 3	2.4	1	2	3	4	5
p 4	2.1	1	2	3	4	5
p 5	1.9	1	2	3	4	5
p 6	2.3	1	2	3	4	5

(Evaluation report to "Tatort Rhein" - see above.')

6.3 Content analysis

Text- or language- and picture information are the main contents, which can be analyzed in a research process (and also in a teaching-learning process).

The following list shows some data which can be recorded when seeing a [illegible]-movie, listening to a broadcast play or reading a text-book article.

List of data for a text analysis:

1. List of subtopics of one medium
2. Weight of subtopics related to others and to the main topic - measured by space occupied on and time taken on the recording
3. Selection of subtopics related to possible subtopics
4. List of subject terms or signalterms in ordér
    - to measure the information density
    - to evaluate the difficulty of terms and the complexity of information
5. List of special groups of speakers featuring in a film such as: commentators, reporters, special interest groups, persons, experts,
6. List of language type used by each group or person: colloquial, literary language, dialect, I, we, my, our, one, people...)
8. List of topics used by each speaker or group
9. List of signalterms used by each speaker or group
10. List of values used by each speaker or group.

To have an objective record it is necessary to use sophisticated observers. Ideally for such a content analysis it is best to have a complete record of a dialogue or a movie content transcript.

Table 2: Example of a signal term record

signal terms used by various discussion groups

Director of a power station	Industry Ministry	People of an industrial village	People of a rural village	Group for nature protecti
nuclear law, environment pollution, etc.	economic growth, resources, etc.	working people, salary, etc.	fog, water pollution, harvest, etc.	nuclear waste, diseases, sabotage etc.

Haubrich 1979

A picture analysis can record for example:

1. film sequences with their contents
2. dynamic and static sequence contents
3. picture sequences in different distances

    near - far

    total - detail

4. perspectives

    vertical - horizontal

    from above - from below,

5. camera movements

    from near to far

    from far to near.

A picture text comparison can also give interesting insights in the content structure of media - for example:

list of sequences with a text - picture - congruence/incongruence

list of sequences with picture neutralising text,

list of sequences with text neutralising picture.

List of people who are engaged in the problem and can be seen,

List of people who are engaged in the problem and cannot be seen, etc.

The above mentioned information can be used to build hypotheses about the cognitive and affective impact of the media in preparation for impact analysis.

But this kind of analysis is also very important for succesful media education. The media impact should not be a one-way process. If the learner is aware of the above categories and knows the intention of the media he will be able to react autonomously, critically and creatively against attempted indoctrination.

6.4 Interaction analysis

The aim of an interaction analysis is to record immediately the actions or interactions in a learning process, while an impact analysis is concerned with effects after the learning-teaching processes have taken place. Interaction analysis attempts to open up the "black box".

An action recorder works accordingly to the following principle. A paper-strip moves with constant speed over a roll. With the help of 20 buttons at the end of 20 cables it is possible to register an event, i.e. the beginning, the ending and the duration of an observable action unit in a process. One can record a maximum of 20 categories of events.

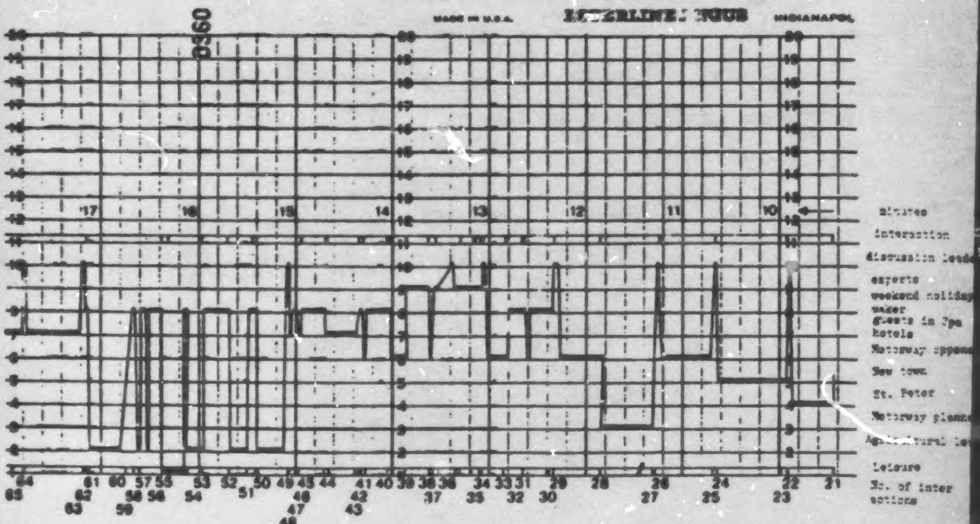
Figure 9 shows from right to left an interaction process, i.e. a record of the beginning and ending of a period of speech by various persons in a role play.

With this instrument it is possible to record many different actions such as:
teacher speaks, asks for information, approves, questions, blames ....
student asks, answers, looks at the blackboard, looks/does not look, at special film sequences, landscape is shown, maps, sketches, animations are shown.

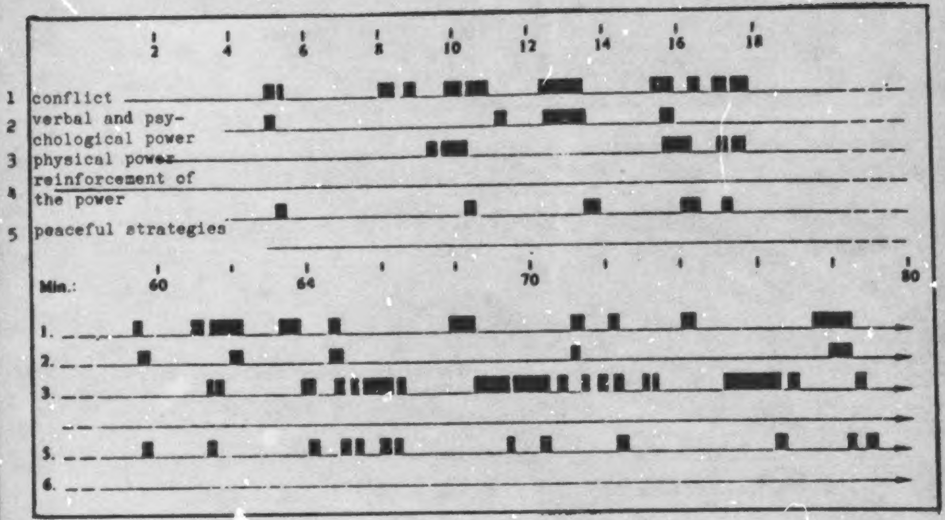
student begins/ends reading a text
solving a task,
writing a text,
drawing a map,
student interrupts his work.

These sorts of records gives information about the special activities of those involved and often allows interpretations or gives a basis for hypothesis building about students' interest in special media or parts of media or their comprehension of the media information.

Such an action recorder or time-scriber can be used for a content analysis of a dynamic media as figure 10 shows it.



Record of an interaction process (role players speak)
Figure 9



Der Schrei der schwarzen Wolfe" (Vereinfachte und verkurzte Ubertragung der Analyse Zeitschreiber und Protokoll)

Record of an action analysis -

cruelty analysis in the movie "The cry of the black loops" (Graf F 1982)

7. Creating a logical research design.

Each research objective needs a special research design, but certain generally recognised models or part of models may not.

Figure 11 shows an example for evaluating and improving media for geography teaching. There is a first edition of a medium X^0 and a learner at the time t^0. The learner is given a pretest in order that his knowledge, attitude or behaviour is recorded at the beginning of a learning process using media. In the following interaction process the learner shows behaviours which are recorded by an action recorder or by other methods as simple counting from preordained categories. The short-, middle- and long-term impacts will be measured by post-tests whose contents must be congruent with those of the pretests. The comparison between the pretest- and post-test results shows how much or how little the learner has changed. The behaviour record can inform about difficulties or causes of failures to learn. The results provide a basis for improving the information and the instrumental structure for one or more media revisions. Subsequently the revised media can be used on another set of learners. This model is very product-oriented and does not consider the effect of teachers and learners. Yet the learner may be very active and may often change his behaviour, so that researchers are often not very successful in predicting the impact of a particular medium. As a result many experts are going to engage more and more in action research whose aim is to enable students to make critical use of media.

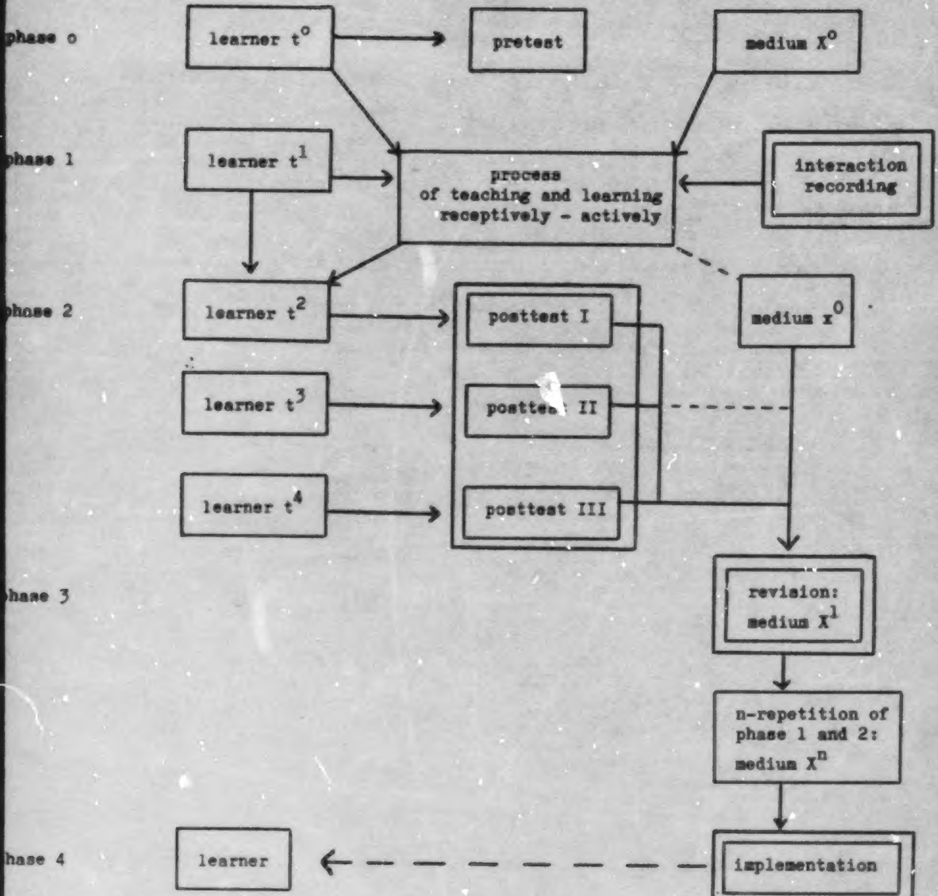

phase o
learner t^o
pretest
medium X^o
phase 1
learner t^1
process of teaching and learning receptively - actively
interaction recording
phase 2
learner t^2
posttest I
medium x^0
learner t^3
posttest II
learner t^4
posttest III
hase 3
revision: medium X^1
n-repetition of phase 1 and 2: medium X^n
hase 4
learner
implementation

figure : An example of a research design in evaluating media for geography teaching.

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Summary: "States of the art"

In this text there is not enough space to give information about mathematical and statistical methods for correlating different variables in order to infer causal relations. This would be a different task, and many texts on research design deal with this aspect of research.

Instead I would like to return to the "philosophy of learning through media" and the problem the various stances adopted pose for research. I think we can differentiate the following methods or "states of the art" in media research for geographical education:

"states of the art"	research activities
method I	observe, feel, describe qualitatively, interpret, ex post;
method II	observe, record quantitatively and inter-personally, interpret ex post;
method III	build hypotheses, design an experiment, record interpersonally and quantitatively interpret, ex ante;
method IV	build hypotheses, design an experiment, record quantitatively and interpersonally, use statistic methods for correlations, interpret ex ante;

The great successes of the so called exact sciences have stimulated researchers to apply the same methods for other fields such as the social and pedagogical fields.

What about the geographical didactitian? Does he want to become a positivist who gets his knowledge only from observable experience, or does he want to become a didactical sensualist who contends that all that is not observable does not exist? Does he want to be a behaviourist who sees all subjective feeling and thinking as not scientifically researchable objects?

As Wehrmeyer (1976) states humourously: "In the pedagogical field compared with the experimental sciences all does not work exactly and objectively according to plan, but more subjectively and perhaps more humanly. There is no smell of rats, birds and monkeys and therefore the results are not seen as so valid".

On the other hand the following quotation from Schulz Teschner/Voigt (1973), avers that pedagogical research methods should "describe only directly observable things, attributes and actions, which are reduced to completely observable units, which are directed to clearly classifiable categories, which record objective, valid and reliable data".

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BROADENING GEOGRAPHIC EDUCATION

(On informing people about geographical knowledge)

Henriette Verduin-Muller

Introduction

Nineteen eighty four, the year of publication of this essay, can be seen as a landmark in information technology. Satellite broadcasting has become a reality within Europe and many channels will spread information all over the old world. It thus seems to be an appropriate moment to reflect on information's function in education: not just in formal education, but also in the fast expanding non-formal and informal education sectors.

Moreover we stand at the threshold of, or are already embroiled in, the break-up of the familiar industrial society, we are moving towards a post-industrial society, since mass-production is increasingly controlled by micro-chip technology, and an information society, since information as a product or raw material permeates all its aspects. Human beings are confronted with a brand new situation: with less work, more time for personal development and more opportunities to communicate. Geography is a subject of immense significance for human beings since it tends to give insight into the manifold of physical social and human phenomena and their interaction in this complicated world, and a new field for educational geography is opening up.

In this essay written as a contribution of the Commission on Geographical Education on the occasion of the 25th IGU congress in Paris, attention will be paid to the special problems of widening the horizons of geographical education. It will focus on one of the main problems, namely the development of educational geographical information as well as the results of research in this field.

On information, its definition, characteristics and function

For a definition of information we look to those given in the rich literature on information theory. Information then is to be defined as any input that a person attends to for the purpose of reducing uncertainty, confirming or incrasing previous knowledge (Goss 1982). As a consequence information can be seen as the raw material for thinking, deciding and acting in every day life.

Information has a great variety of forms and content. Information may have the form of a spoken or written text or a visual image, such as a still or moving picture, a graph, a diagram, a map or a sketch. There exist also a mixed form, the tape-slide sequence is a clear example. The content of information can be extremely varied: factual data, statistics, events, concepts, feelings.

The reader might be aware that the term 'media' is not used here. In the context of this essay I prefer to leave out the channels used for the diffusion of information, because so often information as such is overshadowed by the medium. This is because of the emphasis placed on the spectacular features of the medium in question. Consequently the content of the information does not get the attention it deserves, namely to reduce uncertainty, to confirm or to increase previous knowledge.

Raw material has the potentiality to be utilized for processing, either to a half or to a final finished product. Only if input is 'seen' as a raw material does, transformation take place. The awareness of 'seeing' the raw material is the resultant of an interplay of available knowledge, technological know how and/or societal benefit. Information is real raw material. Input per se, does not contribute to a deepening and refinement of thinking, deciding and acting.

Only if input is identified as information, is apparaised properly, will it become information. It will be clear therefore why in one case input is picked up as information processed,and utilized, where as in another case nothing may occur.

In order to understand the concept information, it was compared with the familiar concept raw material. There exist as we have seen, much similarity, there is however, also an important difference.

As a rule raw material after processing, becomes unrecognizable. In the case of information this is different. After serving to develop one's thinking, deciding and acting information remains unchanged. In other words after processing the basis material is preserved in the original form.

This has important scientific, political and societal implications. It is possible to check and evaluate information as the raw material for thinking, deciding and acting.

Further, as new information becomes available, so new phases of thinking, deciding and acting develop. The generating process usually proceeds slowly and erratically, for man is dependent of his abilities and those are bounded. Moreover, other persons or institutions are often involved in decision and acting procedures. The process of maturation which underlies the generation of new information may take years, dependent on such factors as the specific qualities of the woman or man interacting with the input.

To select input as information has principally to do with creative and innovative thinking of a vertical as well as of a lateral nature. Fortunately, research on creativity and innovation is now plentiful and published in readable and manageable forms.

Thus a reliable store of information gathered in all phases of the generating process is of great importance. In the first instance man may use his memory as a store. In recent years the means of storing information have developed dramatically: tape recording, video tapes, calculators, computers and so on. Next, apart from the storage of private information, information may be stored for public use. Authors, programmers, journalists, public relations officers, documentalists and scientists see it as their task to gather, to process and to publish information. By this means a variety of information storage centers came into being such as archives, libraries, statistical bureaus, info-centres, video-centres, audio-centres, information and documentation centres and electronic data banks.

However, mechanical and electronic apparatus have more processing capacity as well as storage capacity. When during the nineteenth century socio-economic information became more and more complex, mechanization of procedures was initiated. An early example of this in the USA, was when Hollerith developed a 'mechanical assistant' for collecting and processing the 1890 census data. The influx of immigrants together with the high birth rate in the USA almost demanded such a technical innovation. Census mechanization formed a basic contribution to the present computer technology. Until very recently, unfortunately, most attention was concentrated on software technology, that is programming the computer. Gradually this attitude is changing and more attention paid to information in its fundamental aspects. Let us return to our theme and round off this section about information.

Owing to the capacity and variety of information stored, the data is made accessible to other people, who in their turn, can use it to develop their information generation process.

Owing to the world-wide range of the modern communication channels such as the satellite links, the dissemination and diffusion of information has important effects. For example, T.V. satellite connections brought the Vietnam war daily into the homes of the American people. Never had the Americans been so directly engaged in acts of war. As a result judgements as to the merits of events in Vietnam were influenced to a high degree: an initial neutralism turned to denunciation. As a consequence the course of the war was influenced, and the war eventually abandoned.

It will be clear that man can make use of information from a world-wide network to develop his own generation of further information. However, only honest and transparent input has the potentiality to function as information, thus by a generative effect 'to reduce uncertainty, confirming or increasing prior knowledge'. Or to pose it in the spirit of Patrick Meredith 'input has to put in-formation to function' (Meredith 1968).

After being engaged with main aspects of information we turn in the next section to information in the context of geographical education.

Geographical information for education

To begin with we want to give a definition of geography for education. This may sound strange but experience shows that the definition may vary from country to country. Probably this has to do mainly with the origin of geography for education. Until recently geography for education was directly related to academic geography. Yet research has shown that educational geographic information at all levels was made available especially since the early seventeenth century (Verduin-Muller 1982). That is, it predates formal academic geography.

Society has changed extensively and deeply since the mid-sixties and consequent upon this the function and content of geography for education is also changing. One can compare European geography school text books of the Fifties and Sixties with those of the late seventies to see the extent of this change. Even more striking is a comparison as to content and form of the leading periodicals of geography for education in the Western European countries.

My impression is, however, that at least in Western Europe, the differences between the definitions of geography for education, decrease.

The definition of geography for education (outlined later) was formulated by the staff of 'Geography for Education' at the Geographical Institute of Utrecht University in the course of the Seventies, and presented at the 23rd IGU conference in Moskow 1976 (Verduin-Muller 1978). The definition also has become the line of action of the nation wide empirical research group 'Geography for Education'. This group was, by December 1982, still active. It will function as a sub-group of the much larger research group 'Spatial Analysis'. Its organizational features are important as they affect the cooperative aspects of research projects.. Before I give the rather long definition of geography for education I have to mention that education involves formal (regular) and non-formal (adult) education, as well as the broad field of informal education, as illustrated by citizen participation in spatial planning procedures.

The objective of geography for education then is to enable people to see themselves in relation to their immediate and distant environment. This relationship changes continuously. In order to be able to determine his social and existential position, man must be able to orient himself in his environment and to acquire insight into the changes which take place within it. On the one hand, man is part of an ordered environment; on the other hand, he causes changes in this environment by his own activities. Physical processes also cause changes independent of man. Thus a continuous reshaping occurs, either gradually or precipitately.

It is the task of geography for education to make man thoroughly familiar with the existing physical-spatial and social-spatial structures, with the genesis of these structures and with the processes, especially those concerning spatial behaviour, which influence these structures. As a consequence of the continuing spatial reordering man is constantly confronted during his lifetime with new relationships. The underlying aim is, therefore, to enable man to venture independently and acquire insight into new spatial social relationships.

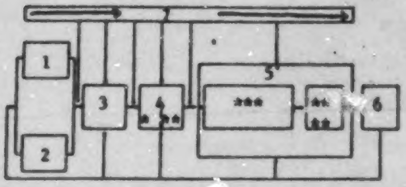
The most striking feature of the given definition is that not only does it give an intellectual explanation of geographical phenomena but it is concerned with their consequences. Man needs to be aware that he has to live in a symbiosis with the potentialities of his environment (in the widest sense of the term). So the geographical content is seen as source material for thinking activities and not an end in itself. This is especially important since man recently began to doubt whether he had a future. He is however, becoming aware that there exist certain boundaries to his exploitation of nature. As we will see and illustrate in the next section working in accordance with these ideas is rather difficult. It is far less complicated to explain and comment on phenomena than to stimulate independent thinking.

We now face the task of developing, designing and realizing a type of educational geographical output enabling the receiver to react to the meaning of the information. This is a difficult task if we accept what is said in the preceding section about the functioning of input as information. However, it is crucial if geography is to contribute to existential enlightenment in a post industrial society.

In order to try to find an answer to the design problem an extensive literature search was made. General literature was examined such as that concerning curriculum development, educational technology, and media, and special literature on geographical education and the geography curriculum. The findings are described and published (Verduin-Muller 1978a, 1978b, 1978c, 1981).

It seemed however, that the designing process had not been addressed; it did not receive attention in the literature consulted. In the course of the years I discovered that the design process as such is underestimated, not only with respect to educational information, but also to products for industry and even entertainment. In the mid-seventies a BBC executive replied, when asked about designing activities, that designing and realizing an information programme is difficult and time consuming, especially if it is to be clear and honest. He further stated that the average listener or viewer had not the slightest idea of the underlying programming processes and that properly speaking the programme maker should add some totally incomprehensible material, in order to get any programme appreciated. This remark gave food for thought and since in the literature consulted I did not come across a method for designing and realizing education geographical information a model for this process was formulated on an empirical basis. This model is also described and published (Verduin-Muller, 1978a, 1978b, 1978c, 1981).

A copy of the model is given as a summary. The elements are numbered and named. For further information the reader is referred to the publications describing the full model and available in Dutch, English, German and Bahasa Indonesia.



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Legend

1. Need/Demand, Objectives, Target group, general
2. Scientific sources.
3. Conceptual Structure.
4. Information Structure.
   - * Global
   - ** Specific
5. Realization
   - *** Constraints
   - ****Definitive formulation.
6. Evaluation.
7. Continuing Process Evaluation.

Experiences with the model

Having developed and disseminated the model as an instrument for designing educational geographical information, we collected from the very beginning reactions on a national and international level.

The finished conceptual curriculum model, carefully written up and illustrated by fragments from the project-work, was presented at the IGU-symposium held in April 1978 in the Department of Geography of the Institute of Education of the University of London (Verduin-Muller 1978d), at the symposium of the Regional IGU-conference in Ibadan (Nigeria) in July 1978 (Verduin-Muller 1978a), at the annual meeting of the American NCGE (National Council for Geographic Education) in Mexico City, October/November 1979 (Verduin-Muller

1979) and in connection to the staff-project Participation Project Randstad at the German Educational Geographer's Conference in Bremen (FRG), May 1980 (Verduin-Muller 1982).

Besides the discussion at the symposia, the model was discussed and put into operation by colleagues in different universities all over the world. A version in the Indonesian language, appeared in 1978 for use with students of IKIP-Bandung (an Institute for Higher Education). Moreover the model continued in use within the Project-work for the doctoral students in the Geography for Education section at Utrecht University. Quite a number of projects were realized along the line laid out in the model. Those projects carried out by staff members, individually and as a group, and by doctoral students in small groups were of different type, covering the formal, non-formal and informal fields in Geography for Education. By December 1982 fifty projects had been undertaken or were nearing completion.

There was from the very beginning continuous reflection on the research undertaken and written up in reports, these, process descriptions, process evaluations, and so on I acquired much fruitful information, not only concerning the actual model as a whole and its elements, but also about the decision making process involved in using the model. Further the very diverse remarks, marginal notes and queries from colleagues in our own country and abroad, gave me a lot of unexpected insight into the complexity of the field under exploration, I had so much information available that I felt able to bring it together in this essay.

A first overview of the experiences with the model was given at the symposium of the IGU-commission on Geographical Education during the 24th IGU-congress, Tokyo, July 1980 (Verduin-Muller 1980). The experiences and reactions, can be classified into five categories. We will mention them in turn and comment upon them.

The first group of reactions is a very understandable one, related to the confusion of Geography for Education with actual geography teaching. From an historical and practical point of view, interest in geographical education usually involved formal teaching. So far as geographical institutes or educational institutes of universities were concerned they always thought in terms of providing courses for future geography teachers.

The difference between designing educational geographical information and preparation of a geography lesson is given in the table below.

Designing educational geographical information	Designing educational geographical instruction
framework: societal need/ desirability target group in general	framework: curriculum pattern and working conditions (entry behaviour of students, time table etc).
↓	↓
content+expression (verbal, visual, audio-visual etc),	content+media-selection
↓	↓
product (with information strategies)	lesson-program
intentional/incidental evaluation (test groups)	intentional evaluation teacher: assignments student: comment/remarks (teacher may make use of educational geographical information in designing his instructional programme)

It was interesting to see that the confusion was characteristic of the situation of many colleaguesin the Western World, whereas our discussion partners in Third World Countries (Indonesia, Nigeria, India, Venezuela, Mexico) did not reveal that confusion. The reason might be that in the Western World geography for education is identified with teaching practices, whereas in the Third World Countries with their shortages of books and other educational materials and lack of educational resources (teachers, schools) on the one hand, and the extension of communication channels at the other hand, geographical educators seemed in the first place to think of the problems of the availability of educational information in any form. We stress that the categories of discussion partners in both 'macro-regions' were the same: namely geography teachers, trainers of geography teachers and academic geographers.

A second kind of feed-back we noticed concerned the use of the model as such. Working with a model mostly constrains the individual, engaging him in various internal conflicts. Two factors are involved:

. personal styles of thinking (people have own ideas) and

. the methodological procedure itself, as formulated in the model.

Thinking is a human not a mechanistic or computerized process. Human thinking bears all the characteristics of creative activity. It is beyond the scope of this essay to reflect on thinking processes and their diversification. We only posit here that within thinking activities the people involved have early points of reference which determine the output of their thinking. Seen in the framework of methodological scientific work the crucial moment then is to take hold of one's own thinking, to get it under control, to plan and to order ideas, and creatively to structure these ideas within the systematic framework of the model.

From our experiences with the model we learned that after studying the model people took a piece of paper and merely wrote down inforamtion for geography in education in a schematic way as an output of their idiosyncratic thinking or, even without taking this intermediate stage, immediately outlined rough sentences, graphs, sketches, and footnotes to pictures. In both 'output' situations the educational geographer has stepped into the model halfway or even at the end, satisfied with his own spontaneous thinking and available knowledge.

But educational geographers usually wish to be more thorough than this, so they return to the model and begin to look more closely at its structure. The result is, however a time and energy-consuming wandering through the model, a rather unsystematic and even discouraging way of proceeding. The discouragement is mainly caused by the fact that the educational geographer concerned, has ignored the early stages of the model which include the crucial concepts structure. Thus it is assumed that the person involved has insight into the needs for the topic and the requirements of the product as well as full knowledge of the scientific sources concerning the topic. This is of course mostly not the case.

But the process is even more complicated. To get full benefit from the model it is necessary to go over each element in the same way as for the model as a whole. So each element and element within the element has to be handled in the authentic fashion of the model. This has to be done to a point beyond which element-analysis contributes no more to the refinement of the educational information design. The output of the separate actions can be given in a single sentence or as headings and when not relevant can be omitted. To work in this way seems time-consuming but in the end it is time-saving because the process is fully under control. At the same time the output in an education-geographical sense is optimised because in a logical, step by step, and a scientific, relevant way, the product is developed.

In the above mentioned way the model gives the educational geographer a maximum of support and freedom at the same time. It is, however, of fundamental importance that the designing of educational information should be the work of a team following the methodological steps outlined. But in doing so the creativity, originality and flexibility must be retained, even stimulated and integrated into the designing process.

The third group of experiences to be dealt with here is mainly from the research with my own students in Utrecht. It is that kind of feed-back resulting from systematic work with the model over a considerable period of time. Apart from the fact that we have to do with a dynamic process when designing geographical information and thus have constantly to solve new problems, we can distinguish within the model between typical barrier and non-barrier elements. First the barriers, there are two.

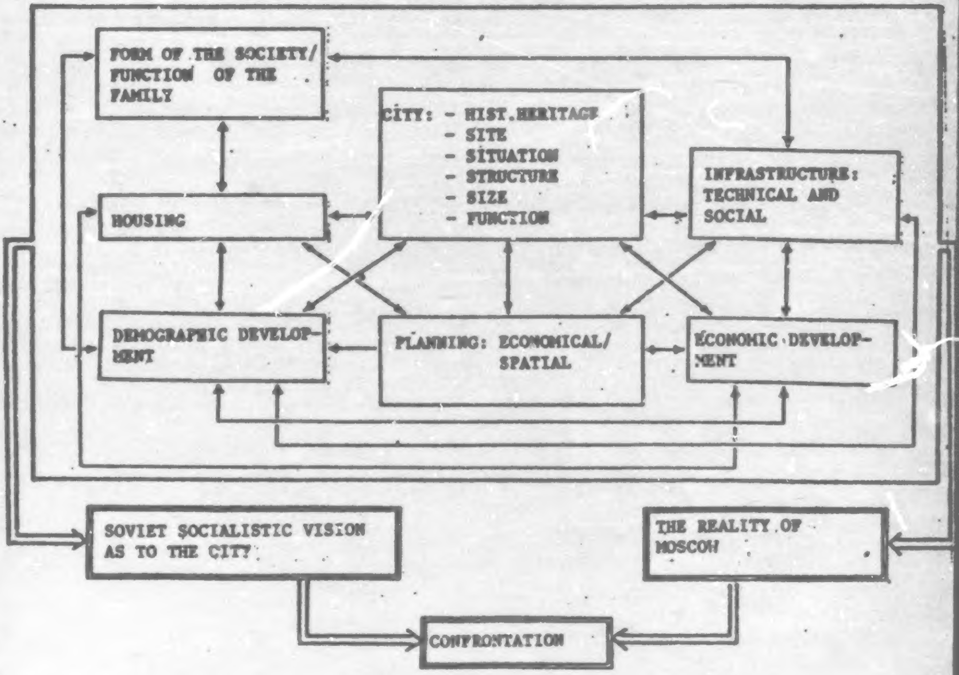
We perceived that the model fell smoothly in two sections: the one being the needs, the target-group in general, the scientific sources and the conceptul structure; and the other the information structure and the realizationphase. The connection, between the conceptual structure and the information structure seems to be a difficult one. Students had great problems in focusing on the essential meaning of the conceptual structure when working at the global and refined information structure. It happened that something quite different emerged. The gap between the two elements appeared to be too wide.

Stepping stones from the conceptual structure to the global information structure are found first by clustering the concepts used in the conceptual structure and second by a precise formulation of a program of requirements for the final product. Such a program of requirements has been roughly mapped out preceding the entrance into the designing process, roughly because honest and clear information does need openness especially at the beginning.

A good example of a conceptual structure with, in this case, built-in clusterings of the concepts used is offered with the designing process of the Moscow-project (figure 2). As a frame of reference we inform the reader that in respect of the given definition of geography for education as a general objective, the specific objective of the Moscow-project was stated as follows: 'for the student to gain insight into the Soviet socialistic vision at the city in a planned economy, with special interest for Moscow (USSR)'. The need for information on Moscow is based on the fact that the Soviet Union is part of the geography curriculum in secondary education. Moreover, up to and including 1983 the USSR is a final topic for the written final examination. The output of the project, indeed is much in demand by geography teachers.

Figure 2

The diagram of the conceptual structure of the project 'Moscow, a socialistic city?' (GE-16, executed between March 1979-January 1980; four students)


FORM OF THE SOCIETY/ FUNCTION OF THE FAMILY
CITY: - HIST.HERITAGE
- SITE
- SITUATION
- STRUCTURE
- SIZE
- FUNCTION
INFRASTRUCTURE: TECHNICAL AND SOCIAL
HOUSING
DEMOGRAPHIC DEVELOPMENT
PLANNING: ECONOMICAL/ SPATIAL
ECONOMIC DEVELOPMENT
SOVIET SOCIALISTIC VISION AS TO THE CITY
THE REALITY OF MOSCOW
CONFRONTATION

As might be clear from the diagram the three groups of concept-cluster are:

- the Soviet socialistic vision as to the city
- the reality of Moscow
- the confrontation

For the Moscow-project the clusters have paved the way for the global information structure. This refining of the instrument has been used ever since.

A second barrier was perceived within the realization phase. There we noticed the problem of optimal visualization. All types of visuals (included maps) tend to be used as illustrations that is as 'extra' and not complentary to the text. By complementary I mean that the 'verbal+visual' form together one means of expression. I think that this deficiency on the one hand is caused by a lack of fundamental knowledge as to the potentialities of forms of expression, and on the other hand with the fact that visual material is so wide spread. As a result, seldom can a student get an overview of the available visual material, some of which might inspire the student and stimulate ideas. Within the Berlin-project (GE-25) we found a striking example of the positive function of a library of visuals. The special position of West-Berlin has led to the setting up of a specially equipped library for visual documentation, very rich and diverse. When the five students of the project group were over in Berlin for primary resource study, the visual library was seen as extremely valuable. When the Berlin project entered the realization phase, it turned out that the discussion about the presentation of the content was very creative probably because of knowledge about the potential of the visual documentation library. One of the reasons for the popularity of the output of the Berlin project for the preparation of excursions and their implementation, may be, apart from the content itself, the harmony between the presentation and the content. It is hoped that electronic data-storage will make available overviews of visual (and audio-visual) geographical source materials, regionally and thematically classified. Particularly time-consuming, were the source-study and the refined information study. Both do require lots of patience and perseverance and are at an operational level more or less at opposite poles to one another. With respect to the source study it is of special interest to note that when there is a need for educational geographical information about phenomena where no scientific sources exist, academic geographical research for the topic may be stimulated by the educational geographer.

The fourth category of experiences with the model concerns content analysis. During the fifties when communication sciences were developing content analysis got much attention. By studying content, researchers hoped to understand the communication process. When it was realized that the content was only an element in the process, content analysis lost its significance. In the content of specific types of communciation such as personal communication or violence on television content analysis now is regaining attention.

Content analysis nowadays is also serving other purposes. With the increase of the serious reviews of textbook and other study material, educationists are implicitly engaged in content analysis. Since our concern is with geography materials, the following remarks are restricted to those type of materials. In counting pages, illustrations, assignments, noticing factual mistakes, the model proved to be of great help. When used in reverse the instrument so useful for designing educational geographical information, opened up important internal aspects of the academic content of textbooks and study-materials.

The idea was born out of practice. People, including our own students asked to see the material output of the design process, that is the final product. In presenting the output and especially in discussing the difficulties and barriers in the designing process it was thought worthwhile for the students, to analyse the output of former projects. Such content analysis thenwas undertaken using the model and questions relating to the geographical content and its informational strategies. The students enjoyed this excercise. The next step and logical consequence was to use the model to make a content analysis of textbooks and other study materials. The specific value can be clearly formulated. It seemed significant for determining the educational geographical value if the reviewer can dig out from the books or study material under consideration the conceptual structure of the content as a whole and the chapters or sections separately.

The fifth and last category of experiences has nothing to do with the model in itself, but everything with the consequences of working with this educational geographical instrument. It was observed that quite a few students took up novel forms of employment involving the processing and producing of geographical information for education. They operate at a management as well as an executive level. They are engaged in work concerned with physical planning information, the spatial-planning of schools, the processing and dissemination of information about planning, the diplomatic service outside the Netherlands, the development of Third-World education, Third-World information projects, secretariat positions in Commissions on the tourist development, editorial work concerning, educational geographical information materials such as textbooks and other study materials (including television and educational and documentary films) for formal, non-formal and informal education, full-time authors of schoolbooks for geography and geographical documentary materials, and further free-lance information officers for geogrpahy.

When asked what Geography for Education contributed to their dailywork, the average student answered that, besides a thorough academic study of geography, c[illegible]ing the model on a project-base (with personal reflection in a thesis) meant a continuing confrontation with processing and production problems as to geographical knowledge. Also stressed was problem-solving in the context of a team (four to five students at maximum). Educational geography information processing can therefore be classified as a form of applied geography. Early 1982 this was inserted in the Academic Statute in the Netherlands.

Summary and final remark

In the first section of this essay attention is paid to information in its function ofraw material for the mental generating process of human beings. I stressed that only output of a qualitively high standard can fulfill its potential as information. In a society with an emancipatory character as will be the situation in post-industrial economies, man has time and opportunity to work on his own generating process and with this give his existence a more flexible basis. As a contribution to this process of thinking, deciding and acting educational geography plans an important role when providing relevant information. In the second section, geography for education was defined and education seen in its broad significance (formal, non-formal, and informal). The question arose of how to design and realize educational geographical information which meets the requirements of honesty and clarity. For this reason a model for processing educational geographical information was formulated in the late seventies in the Geography for Education section of the Geographical Institute, University of Utrecht and published in Dutch, English, German and Bahasa Indonesia. A copy of the model is given in the essay.

Experiences with this instrument for designing educational geographical information are grouped in five categories and discussed in the third section of this essay. A main conclusion is that in being concerned with educational geographical information processing procedures new future developments in this field are being initiated.

New developments do create new jobs. And new jobs will be required in designing and realizing geographical information for education purposes at local, regional, national and international level. On the other hand we have to be aware that producing educational information in practice will nearly always be a matter of team-work. Participating in the team are also non-geographers, such as media specialists. It has to be stressed that the final responsibility for the educational geographical information process under consideration and the product as its output is with the team. In case of disagreement it must be the educational geographer who takes the decision. However, he can only be credible when the methodological instrument to process and produce educational geographical information is thoroughly evaluated as well as the academic content of geography.

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THREE BRAZILIAN COGNITIVE STUDIES ON GEOGRAPHICAL EDUCATION

Livia Oliveira

Introduction

There is an increasing preoccupation, among geographers educators, on how children construct geographical concepts. Such questions as: which geographical concepts do children have to construct, and how are these concepts constructed; these have primary importance for geographical education. The answer to these questions may come from psychological studies (on the teaching/learning process) as well as from epistemological researches (on the content of geography).

Research in geographical education is relatively new in Brazil and the studies included in this paper used Piagetian theory as a conceptual framework to establish antecedents to consequences of interactions between teachers and pupils in the process of teaching/learning geography.

Piaget's investigations into the development of a number of logical, physical and mathematical notions, as well as other aspects of the child's thought, implicitly contain a number of ideas which, if suitably exploited and developed, could prove valuable to educators, educational planners and teachers. Perhaps the most important single proposition that the educator can derive from Piaget's work, and thus in the classroom, is that children, especially young ones, learn best from concrete activities. In Piaget's view, one of the major sources of learning, if not the most essential one, is the intrinsic activity of the child. The child must act on things to understand them. It is through manipulation that he develops schema related to objects. When new objects are presented, the child may at first try to apply to them already established schema. If not successful, he attempts again through manipulation, to develop new schema, that is, new ways of acting on and thereby comprehending the world.

By promoting activity in the classroom, the teacher can exploit the child's potential for learning and permits him to evolve an understanding of the world around him. The principle that learning occurs through the child's activity suggests that the teacher's major task is to provide for the child a wide variety of potentially interesting materials on which he may act. The teacher's job then is not so much to transmit facts or concepts to the child but to get him to act on both physical and mental levels. These actions - far more than imposed facts or concepts - constitute real knowledge.

Once we accept Piagetian concepts on activities, we implicitly also accept the pedagogical application of such concepts. From this follows that activity is necessary and essential in the construction of knowledge at any level. In an educational context it means the organization of tasks which will serve to operationalize notions considered essential for the development of intelligence.

Teaching through activities does not aim to substitute or hasten the natural and spontaneous concept construction process, it preconize operational tasks that will permit the systematization of knowledge and will preclude the formation of rigid intellectual habits. The structure of these operational tasks permits the child to proceed from the simple manipulation of reality to the utilisation of thought and the development of reasoning. These in turn allow the children to organise the elements that come from the contact with reality. In other words, the operational tasks prepare the child to initially work on concrete realities and later on to work on effective actions such as speaking, writing or constructing.

The following description of three studies carried out in Brasil are presented here because they centered their attention on the Piagetian concept of spatial activity. The three authors considered the tasks performed by children in the studies as forerunners for their work with maps.

1. Projective Spatial Relations Applied to Map Reading (Livia Oliveira)

Individuals establish the projective spatial relations of right/left, front/behind and above/beneath using the body as a reference. It is the upright position comprising the trunk, upper and lower extremities, head and feet that provide the elements to determine the organic directions that correspond with the three dimensions of physical space: width, length and height.

The orientation of man in geographical space has always depended on an objective system of references. Therefore, he looked for fixed points in the external world or points that could be so considered.

The sun was the first reference point to be established. It permitted the fixing of a point corresponding to sunrise and another to sunset. From here were derived the first cardinal points: East and West. In the northern hemisphere the Polestar of the Little Bear constellation was considered a fixed point indicating North and opposite South was determined. In the southern hemisphere the Magellan star of the Southern Cross constellation was taken as a fixed point to indicate the South and opposite North was determined.

This geographical co-ordinate axis allowed man to move and to orient himself in earth space. But orientation in cartographic space, that is, on a map demands a transformation of the three dimensions of physical space into two and choosing directions on a flat surface. At present by convention, the right side of a map corresponds to the East and the left side to the West; the North corresponds to the top and the South to the bottom. These body relations are based on the viewpoint of the map maker or the map user. The transformation of an organic reference into a geographical one is a psychological process and requires the possession, by the individual, of Euclidean co-ordinates and spatial projective perspectives.

This study was devised to observe the application, by school children, of projective spatial relations to map reading.

The assumptions of the study were: (1) existence of a positive correlation between right/left notions with East/West; (2) a positive correlation between the above/beneath notions and North/South; (3) that the aforementioned correlations will permit the child to read the map and; (4) that the teaching/learning process of the map will depend on the intellectual construction of the projective spatial relations.

The study was carried out in 1974-75 in the city of Rio Claro, Sao Paulo, Brasil with 321 children (160 boys and 161 girls) enrolled in all the fourteen governmental schools with ages ranging from seven to fourteen years of age. The participants of the study were randomly selected among 3005 students representing the total universe of 9384.

The data was obtained by the administration of three tests specially prepared. Each test had three sections or parts. The first test (A) was devised to verify children's cognitive stage with respect to right and left notions; the objective of the second test (B) was to determine the cognitive stage in regard to the above/beneath notions; the third test (C) tried to measure the East/West and North/South notions on a flat surface.

Test A was derived from similar tests applied by Piaget at the time he studied the logic of relations. The same process was adopted to construct tests B and C.

All the three tests attempted to evaluate progressive understanding on the relativity of the right/left, above/beneath, East/West and North/South notions, which according to Piaget spring into being from pure egocentrism and gradually proceed towards socialization and objectivation. In other words, through the tests we tried to ascertain to what extend a child is conscious of the relativity of all the different viewpoints presented in the tests. The Kuder-Richardson test, modified by Tucker, for measuring the reliability co-efficient r_{tt}, was used to verify the reliability of the four tests.

Results:- According to Piaget a question is valid (i.e. it measures what it purports to measure) at a certain age when no less than 75% of the children answer it correctly. TABLE 1 indicates that seven year old children accomplished this only in item 1 of tests A and B. Item 1 A asked to show the right and left hand and the right and left leg; and item 1 B, to answer if the forehead is above or beneath the nose; the eyes above or beneath the nose; the chin above or beneath the mouth. No seven year old child was able to answer any item of Test C_2. But 14 year olds answered correctly all the items in all the tests.

Our assumptions that there existed a correlation between right and left notions with East/West directions, and between above/beneath with North/South was confirmed after the application of contingency co-efficient C. The figures pointed up a C value of 0.50 for tests A and C_1 (right/left and East/West) and 0.40 for tests B and C_2 (above/beneath and North/South). According to Siegel the highest possible correlation is 0.86 and not 1.00 as happens with other correlation measures. I believe that higher correlation between the notions of right/left with East/West occurred because man first established relationships between his own body and an external orientation system.

There is little doubt that the intellectual development of geographic space depends on the construction of space by the individual. The findings showed that spatial ability develops concomitantly with other abilities such as language, number, time, etc.

Conclusions

1. The map has been used only as a visual resource without taking into consideration the spatial development of the child and also ignoring childrens readiness to work with maps.
2. The absence of a map reading methodology militates against the educational role of the map. One of the strategies for developing a map methodology is to present the cartographic content to children and adolescents bearing in mind their intellectual development and specially their cognitive and perceptive development of space and its representation.
3. The development and organization of cartography for children is a natural

TABLE 1

ITEMS ANSWERED CORRECTLY BY 75% OR MORE OF THE CHILDREN IN ALL TESTS (n=321)

AGE	Item's Number Correctly Answered by More than 75% of Children			
	*TEST A (right/left)	**TEST C_1 (East/West)	***TEST B (above/beneath)	****TEST C_2 (North/South)
7	1	1	1,2	0
8	1	1	[illegible],2,4	0
9	1,3	3	1,2,4	0
10	1,2,3,4	1,3	1,2,4	0
11	1,2,3,4	1,2,3	1,2,4	1,2,3
12	1,2,3,4	1,2,3	1,2,3,4,5,6	1,2,3
13	1,2,3,4	1,2,3	1,2,4,6	1,2,3,4
14	1,2,3,4,5,6	1,2,3,4,5	1,2,3,4,5,6	1,2,3,4,5

* Total of items: 6
** " " " : 5
*** " " " : 6
**** " " " : 5

by-product of a map methodology. The success of cartography for children depends on whether the map is viewed as one among the various available kinds of language that the individuals use to communicate among themselves.

2. Cognitive Initiation to the Map (Jandira Maria Cecchet)

It is through the establishment of spatial relations that the individual locates in space. The construction of these relations, like learning how to read and write as well as learning mathematical quantities, constitutes an educational problem specially at the beginning of the child's schooling.

The studies carried out by Jean Piaget and his associates on the child's construction of space concepts were the first to demonstrate the importance of developing at the outset the topological concepts and later on the projective and Euclidean concepts.

In the work of Piaget and Inhelder on the representation of space can be found the starting point for studying the problems of a child's initiation to the map - or to spatial relations. The emergence, in the child, of an ability to conceive of spatial relations follows a different order to that observed during the evolution of scientific concepts. In the child - in contra distinction to what has been observed in science - the understanding of topological relations appear before the understanding of projective and Euclidean relations.

After the Genevan studies, the canadian followers of Piaget, Laurendeau and Pinard published a comprehensive study that confirmed Piaget's postulates regarding the primacy of topological concepts over Euclidean and projective concepts.

The child's first concepts of space are topological in character, that is, they are based on such properties as proximity, separation, succession, surrounding and continuity. The child initiates the construction of these relations from birth and they become more evident during the pre-operational stage, and at the end of this stage (around seven years of age) almost all the topological relations are integrated in stable operational systems.

In this study the emphasis is with child's cognitive initiation on spatial representation. The main interest of the author was to test the hypothesis that operational tasks involving elementary topological spatial relations like proximity, separation, succession and surrounding ease the way for the organization, by preschool children, of the basic topological spatial relations of a geographical representation.

The author was also interested in testing if children's performance was significantly different with respect to sex, age, the establishment of elementary topological spatial relations of proximity, separation, succession and surrounding, and the three scale levels of geographical representation of the schoolroom/school, school/schoolblock and schoolblock/neighbourhood.

The study was carried out in 1981 in one governmental school of the city of Passo Fundo, State of Rio Grande do Sul, Brazil, with two preschool classes totalling 38 children. The age of the boys and girls who participated in the study ranged from 5:5 to 7 years.

The subjects were divided equally into two groups: one experimental and one control. To both groups were administered a pre-test and a post-test. In the experimental phase the children were exposed to a pedagogical treatment (operational tasks) during the interval between the application of the pre and post tests. The operational tasks were performed in a progressive sequence of complexity: space level one, two and three. The completion of the tasks at each level needed five sessions of 50 minutes each, with a total of 15 sessions, lasting one month.

The operational tasks were constructed with topological spatial activities including the elementary relationships of: proximity (near/far), separation (joint/apart), succession (before/middle/after) and surrounding (inside/outside). It was done so because these are the first relationships established by the child, both at the perceptive and representative levels. These topological relationships were studied at three levels of the preschool child space: schoolroom/school; school/schoolblock and schoolblock/neighbourhood.

The activities performed by children included drawing, cutting out, pasting, choosing, representing, strolling, observing, colouring, narrating, touching, feeling. In performing these activities, the topological spatial relations mentioned earlier were considered.

Results:- Figures 1 and 2 show the performance of each child in the experimental and control groups in terms of the scores attained in the pre and post tests. The scores of the control group indicate a slight variation in the pre and post tests, whereas the variance in the experimental group is clear and children achieved higher scores in the post test tasks. The pre and post tests lines follow a similar pattern.

The Student's t test with a critical value of 2.70 and a 0.01 level of significance was employed to determine if significant differences existed between the experimental and control groups during the pre test. The results (t = 2.15) indicated that there was no significant difference among the two groups before the pedagogical treatment. The same statistical test was used after the pedagogical treatment and the results showed a significant difference between the experimental and control group (t = 8.13). These results confirmed the main hypothesis that operational tasks aid children to establish the topological relations of the geographical representation.

With respect to sex the results showed no significant difference in the performance of boys and girls. The same thing was observed in relation to age: there was no significant difference between the age group from 5;5 to 6;2 and the group from 6;3 to 7 years of age.

The analysis of variance, F ratio, with a critical value of F = 4.08 and a 0.01 level of significance was used to verify the hypothesis that children's performance was significantly different when they try to establish elementary

Figure 1

Pre and Post Tests Scores of the Experimental Group

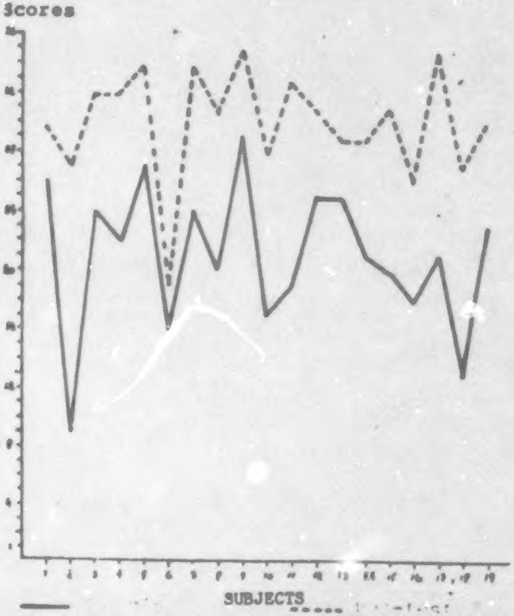
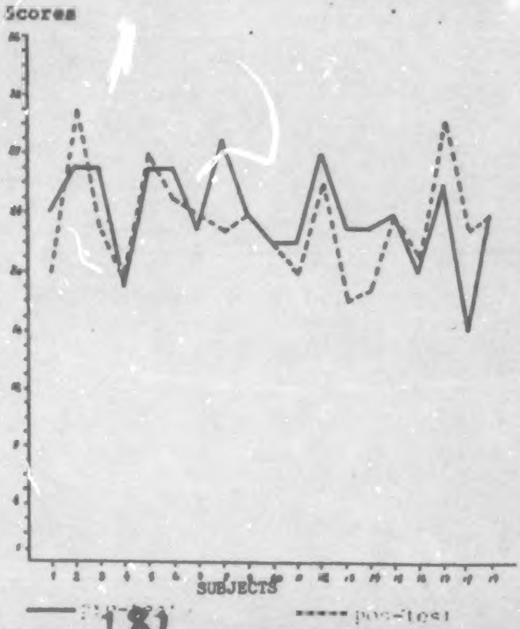


Figure 2

Pre and Post Tests Scores of the Control Group



topological spatial relations. The results for the experimental group (pre test 13.17 and post test 5.36) and for the control group (pre test 18.26 and post test 8.26) confirmed the hypothesis. The figures obtained indicated that children had more difficulty establishing the succession topological spatial relations than the other relations. The difference was statistically significant

The results also revealed that there was no significant difference between the three space levels of the geographical representation.

With this study was demonstrated that it is possible to teach small children the prolegomena of map foundations through the operationalization of space topological relations at the preschool level.

3. Teaching/Learning of Latitude and Longitude Notions (Lucila Elisa Lorens Goes)

The teaching/learning of latitude and longitude has always been a problem for teachers in the classroom. And for the students the problem remains after they leave school because people have difficulty identifying if latitude refers to North/South or to East/West, or if longitude is East/West or North/South.

The main purpose of this study was to devise operational tasks on latitude and longitude aiming to facilitate the link between Piaget's developmental psychology and the work of teachers and students at the classroom level.

The teacher's theoretical knowledge of the subject matter is as important as the knowledge about the intellectual development stage of the pupils with whom the teacher will work - the readiness of the child for the teaching/learning notions of latitude and longitude. In other words, the paper deals with one of the various aspects of what can be called a "map methodology" and suggests a variety of operational tasks that teachers may use as preparatory instruction to enable children to learn what latitude and longitude are.

The operational tasks were patterned after Piaget and Aebli. In Aebli's opinion, in no circumstances does new behaviour appear suddenly; it is always based on previous behaviours. Thus, every notion and every operation have a history, the history of their progressive and continuous construction stemming from previous elements of thought. Indeed, thought is not defined as a set of static elements, as a collection of contents of the mind, but rather as an interplay of lively and acting operations. Likewise, school subjects should be conceived as operations, in which case the content is subordinated to them. It is up to the teacher to select the information and activities related to the content allowing the student to construct a particular operation. Therefore, to know the notions of latitude and longitude means to construct the inherent operations of these notions because operations always define notions and the teacher should offer the student opportunities to execute those operations, at first concretely and later on in an interiorized or represented manner.

The notions of latitude and longitude enable the location of a point on the surface of the earth, and on its turn, location encompasses a set of simpler operations such as: identification of reference points, indication of directions and determination of distances. These assertions served as the framework for the elaboration of the operational tasks used in this study. More specifically, the author constructed the operational tasks using reference, direction and distance notions.

The operational tasks were designed for school children of the first to eight grade, with ages ranging from seven to fourteen years. The activities needed to carry out the tasks are the same that students normally perform when they engage in games or during play time.

The operational tasks consisted of three types of exercises: Task A, activities related with the use of references; Task B, activities associated with the determination of distances; and Task C, activities linked to the conservation of directions.

The subjects were assigned to four groups; each group corresponded to two grades: Group I (first and second grades); Group II (third and fourth grades); Group III (fifth and sixth grades); and Group IV (seventh and eight grades).

The operational tasks carried out by all groups included three different kinds of tasks. Group I: Task A, Everything in its Place; Task B, Basketball; and Task C, The Route to the School. Group II: Task A, Sea Battle; Task B, Cutting the Cake; and Task C, City Map. Group III: Task A, Soccer with Buttons; Task B, Treasure Island; and Task C, The Navigator. Group IV: Task A, Marking Positions; Task B, Marking Cities; and Task C, The Whole World.

The author concluded that the notions of latitude and longitude cannot be taught and learnt too early they need a preparatory period when students will carry out exercises or tasks that will enable them to learn the highly complex and intricate notions, yet, so fundamental and indispensable for map reading.

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RESEARCH IN COMPUTER ASSISTED LEARNING

W. Ashley Kent

Introduction

Few geography teachers, as yet, integrate computer assisted learning (CAL) with their day to day classroom teaching. Many are unaware of the increasingly wide range of possible ways in which microcomputers can support the learning proces. Common feelings are that microcomputers (micros) are limited to statistical work and are an unnecessary and expensive irrelevance in the geography classroom. This is partly the result of poor communications by those involved in CAL geography but is mainly a direct result of the early stage of development of this new teaching resource and medium. The hardware has only just arrived in many schools and software is limited in quality and quantity. In a world used to quick answers/solutions many geography teachers are frustrated by the software available to them and perhaps have expected too much too quickly.

The stage of development of CAL geogrpahy varies across the world. A recent IGU newsletter (1981) encouraged geographers to become involved in educational research into CAL but the response has been limited. In most countries there are isolated individuals working in this area (e.g. Forer, 1978) but few coordinated developments, to this author's knowledge, occur within or indeed across national boundaries. At the influential National Educational Computing Conference (NECC) held in Kansas City, USA in June 1982, it was obvious that computer literacy was the prime concern of the 1500 or so conferees. Social studies and geography teachers were in a tiny minority, quite clearly swamped by computer studies teachers. This was reflected in software available which for geography was very rare and where it did exist was of a 'drill and practice' type. International contacts between geographers concerning CAL are at present very limited. It is hoped that the conference held in April 1983 at the University of London Institute of Education on 'CAL in Geography' will have been the first of many efforts to formalize international debate.

Probably the UK is as advanced as any other country in CAL geography for three reasons: firstly the funding in the 1970s of the National Development Programme in Computer Assisted Learning (NDPCAL) which spawned GAPE (Geographical Assoociation Package Exchange); secondly the funding since 1972 by the Schools Council of the Computers in the Curriculum Project; and thirdly and probably most influential, the British Government's funding of the MEP (Micro Electronics Education Programme) scheme as well as the Department of Industry's scheme to put a 'micro' in every school. This has lead to the development of a range of software, in the vanguard of which are the two major publishers, Heinemann and Longman. Alan Hill (1981) argued when reporting on the World Conference on Computers in education held in Switzerland in 1981, that "the British educational contribution was pre-eminent, not only in the discussion sessions, but also in the demonstration of software. The most crowded and popular display was in the room which housed both the Computers in the Curriculum unit of Chelsea College and Rosemary Fraser's ITMA (Investigation on Teaching with Microcomputers as an Aid) unit from the College of St. Mark and St. John. Chelsea College were showing the various programs in the forthcoming Phase Two of their project - formerly funded by the Schools Council, and now by MEP. Their programs, together with those of ITMA were a clear dimension ahead of anything else on display . Also the literature for teachers in the UK is growing rapidly from an admittedly small base. The important early contribution was by Shepherd et al (1980) and various others have followed (Kent, 1983, Hall et al, 1982 Kent, 1982). Equally the amount of educational research into CAL geography is greater in the UK. All this explains, along with the author's British residence and experience, why this chapter relies on exemplars from the UK.

The need for research

The need for research into CAL is clear. As was argued in a recent issue of CAL News (Kent, 1982), 'The signs are that there is an awakening to the vital need for such educational research. Individuals (and a few teams such as ITMA) are beginning to come to grips with a range of important research questions, such as: How effective is this software for pupils? What are student attitudes in general to computers and in particular to CAL? What makes for an effective training programme for teachers? What are the barriers to this curriculum innovation? What are the most effective uses of the microcomputer in the geography classroom? What management style of CAL is appropriate.

The need for research is particularly urgent at a time when there has been a great rush to produce programs because of various political, social and economic pressures. Software developments, as yet, have benefited little from the inputs of educational evaluations. Such a new teaching resource with its many exciting potentials necessitates careful analysis. However, such research as exists, it was argued by Shepherd et al (1980), 'leaves a lot to be desired, and largely because traditional methods of evaluation are difficult to apply to CAL.' Sakamoto et al (1979) commented that 'the systematic study of CAL materials from a formative viewpoint has scarcely been conducted.' Needless to say the major purpose of evaluation is to try and improve the quality of education by collecting information so that informed judgements can be made about CAL geography.

The author takes research to be the same as that defined by Mouly (1978):- 'Research is best conveived as the process of arriving at dependable solutions to problems through the planned and systematic collection, analysis and interpretation of data. It is a most important tool for advancing knowledge, for promoting progress, and for enabling man to relate more effectively to his environment, to accomplish his purposes, and to resolve his conflicts'.

Some general research has been undertaken into CAL which has been of value to researchers into CAL geography. This includes work by CERI (1976) which evaluated the NDPCAL Project; the work of the ITMA team, in particular their use of SCAN (Systematic Classroom Analysis Notation) (ITMA 1979); and Laurillard (1978, 1980), whose research interests include pupil activity and language.

Most CAL geography research is ongoing and even completed work is relatively recent. The earliest piece of research was by Grummitt and that was in 1978. An up to date list of titles and status of research is listed at the end of this article.

Types of research in CAL

One way of grouping research studies on CAL geography is to use the following five categories:

A. Classroom Studies
B. Evaluation of Programs
C. Resource Allocation and Management Policies
D. Curriculum Development
E. Teacher Training

The questions stated are the author's paraphrasing of the recently completed or ongoing research known to him. For the correct title, status and location of the research, the reader is advised to consult the list at the end of this article.

A. Classroom Studies

1. What are the differences in learning effectiveness between two contrasting CAL teaching styles? (Hassell, 1982)

2. What are pupils attitudes to CAL geography before and after CAL lessons? (Robinson, 1982)

3. How do teachers/pupils/micros interact in CAL geography classrooms? (Hall et al)

4. What are the particular benefits of CAL geography simulations? (Watson)

5. When a topic is taught traditionally and then by CAL, what are the learning differences? (Grummitt 1978)

6. What group work language is generated by the use of a micro? (Cummings)

B. Evaluation Programs

1. How valuable/effective are the GAPE programs? (Those developed since 1981) (Midgley)

2. What niches in school geography might CAL best serve? How does one develop and evaluate such programs? (Ramsay)

3. Hurkle and the Poverty Game. How successful are they in classrooms? (Abbott, 1980)

C. Resource Allocation and Management Policies

1. What is the local impact of the MEP? (Kent)

2. How have LEAs developed a policy on buying micros for their schools? (Burdett)

D. Curriculum Development

1. What is the knowledge of, and attitudes towards CAL geography by geography teachers in one LEA? (Freeman, 1981)

2. How, at the local and national levels between 1982-85, has the innovation of CAL geography been received by teachers? (Kent)

3. How far have geography teachers in three English regions adopted and changed attitudes towards CAL geography over a three year period? (Hall et al)

E. Teacher Training

1. What CAL provision is made in initial training and INSET for geography teachers? (Yaffe)

A further categorization of research can be according to:-

A. Scale of Consideration
B. Methodology
C. Techniques for Data Collection

A. Scale of Consideration

1. National e.g. Burdett, Yaffe
2. Regional e.g. Hall et al
3. LEA e.g. Freeman, Kent
4. Classroom e.g. Hassell, Robinson, Grummitt, Cummings, Abbott

B. Methodology

1. Summative e.g. Hassell, Grummitt
2. Formative e.g. Hall et al
3. Anthropological e.g. Kent, Watson
4. Agricultural/botany e.g. Grummitt

C. Techniques for Data Collection

1. Conversation and interviews e.g. Freeman
2. Questionnaires e.g. Kent, Burdett, Freeman
3. Video recording e.g. Hall et al
4. Audio recording e.g. Cummings
5. Analysing learning resources e.g. Midgley, Ramsay
6. Pupil assessment e.g. Hassell, Grummitt
7. Semantic differential e.g. Robinson
8. Classroom observation schedules e.g. Hall et al
9. Diaries e.g. Kent
10. Course and program evaluation proforma e.g. Yaffe, Watson
11. Longitudinal e.g. Hall et al, Kent

At first sight this is an impressive array of research but arguably this is deceptive. All rigorous educational research has to limit it's focus of consideration and these are no exception especially as about half represent first or second (M.Ed, M.A.) degree work not the usually more extensive and original M.Phil. or Ph.D. research. Many gaps remain.

Of the fifteen pieces of research mentioned here, nearly three quarters (9) are in the classroom studies or evaluation of programs categories. This reflects the most immediate needs of geography teachers now. Indeed most of the researchers in these categories are practising teachers who are engaged in action research to do with the present use of progams in the classroom. Only three studies, to the knowledge of this author, are of the curriculum development category. This contrasts with the 34% of all research studies listed by Corney (1982) which deal with curriculum planning or processes of curriculum development and influences on change in geographical education.

Equally the majority of CAL geography research could be said to be positivistic social science relying on questionnaires, structured interviews, setting up experiments and 'objectively' observing and describing phenomena. As Cohen and Manion (1980) put it, the choice of research paradigm to be adopted is of crucial importance since it determines whether the researcher will 'identify certain issues as of interest to him and ignore others; he will ask certain questions and not others; he will adopt certain research methods rather than others; and he will show a preference for certain kinds of analysis, explanation and theory'. Data have different meanings according to the paradigm a researcher uses. On the one hand in positive studies, data are always data for some hypotheses or other whereas in interpretative studies, data are the source of hypotheses and interpretation. Research studies may be placed along a continuum between 'hard' and 'soft' research. Of course there is a danger here of artificially polarizing such research studies since many researchers adopt a pragmatic 'triangulation' approach whereby both soft and hard methods of data collection are involved. However it is felt that this categorization of research gives a further view of the range of such studies.

Certain issues arise out of such research into CAL geography. Proving whether a CAL geography lesson is better than another type of lesson is an unsolvable problem. Variables cannot be held constant in a true experimental fashion and probably more worthwhile are those researches focussing on the differences between different styles of CAL. Hassell's work is an example of this, but even here rigorous scientific method is difficult to implement. Similarly as in much other educational research there is probably an over-reliance on questionnaires though their validity and response rates suggests that this information they yield may not be reliable.

A particular problem of research into CAL is the remarkable pace of change in both software and hardware developments. In a sense this makes all research date rapidly. This is especially true of software evaluations since by the time the study is complete the software in question may have been superceded. There is a clear need here for educational research into CAL to be effectively and quickly relayed to key decision makers. At present this rarely happens and as with other educational research dissertations rapidly gain dust in libraries.

Another problem with such research, at present at any rate, is the difficulty of access to classrooms and teachers. On the one hand only a few innovative teachers are using CAL in their classrooms and even they understandably find the intrusion of an evaluator worrying. (e.g. video film and the research of Hall et al). On the other hand many teachers though interested in these developments find them confusing and disconcerting. They will cooperate with researchers but feel pressured (by the press? by their colleagues? by their advisers?) to comment favourably when they may have severe reservations. Getting at their real attitudes is intractable.

The future needs for such research are relatively clear. Firstly and very important is the need to coordinate and exchange information on the rapidly growing research which is being undertaken. In the UK at any rate a start was made in 1982 when the author instigated a series of research seminars to be held yearly at the London, Institute of Education. A similar initiative was taken with regard to members of the ICU. Secondly the work of the MEP and generally the UK government's role in CAL, cries out for further research work. Thirdly more and more teacher evaluators/researchers are needed to widen the range of classroom and program based evaluations as this new medium begins to take off. Finally a plea is made for more 'soft' research the findings of which need to be made known more rapidly and efficiently than at present. Those interested in these or other possible future research directions in CAL geography should not hesitate to contact the writer.

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RESEARCH INTO THE PROBLEM OF METHODS OF GEOGRAPHY TEACHING IN THE U.S.S.R.

L. M. Pancheshnikova

Introduction

The last decade has seen greater attention paid to the development of methods for, and to the logic behind research in the field of pedagogics and, more particularly, in the teaching of geography. While formerly methodological recommendations were based upon the competence and expertise of an individual specialist, recent years have witnessed a wider use of objective techniques for research into theoretical problems and for developing practical recommendations. The extent to which research techniques have been improved and refined represents an important indicator of the theoretical standard of "methodological science".*

Research techniques used in geography teaching can be grouped, provisionally, into two categories - theoretical methods and empirical methods.

Theoretical Methods

Theoretical methods are used to synthesize information, to arrive at regularities in the phenomena and processes under study. In recent years techniques for geography teaching have come to incorporate a structural system approach (which can also be said about other sectors of pedagogical and geographical sciences). The fundamental idea behind this approach is that the objects of reseach are regarded as a set of integral systems comprising interrelated elements, whereby research is centred upon identifying the interrelations

*"methodological science" is understood in the USSR as a discipline treating of the aims, contents and ways of teaching an academic subject.

and interactions between the elements. With this as a fundamental premise, research into the process of teaching geography, (to which "methodological science" is applied) emphasis is placed upon identifying relationships between the behaviour of the teacher and the students, between the objective, content, methods and means used in geography teaching; between internalization and retention of knowledge, development, and character building of students, etc.

An important role in this research is played by a typological approach, which is used to group together the objects and phenomena under study, and to identify the substantive features in each of the groups. For example, use is made of the typology of elements included in the substance and contents ofthe process of geography teaching. Therein one distinguishes between knowledge and skills. In its turn knowledge is classified into theoretical and factual. Theoretical knowledge includes the geographical theory, ideas general notions, methodological knowledge, etc. The typological approach can be gainfully used in analysing teaching material from text-books and curricula, its application helps ensure an adequate scientific standard of the contents and substance of education. Research into problems related to the organization of students' cognitive behaviour is related to the classification of assignments for independent work into two groups: typical and creative etc.

Mathematical research techniques have begun to be used. Their purpose is not confined to just making calculations (which is important, for example, in processing data related to a broad and massive study of the operation and performance of schools). The basic function of these methods lies in identifying and explaining the intricate relationships and regularities of pedagogical phenomena. For example - what kind of factors would determine the teaching style, what sort of relationship exists between the content and methods of teaching on the one hand and the knowledge and skills of the school students on the other.

Theoretical methods include a historical method. The principal idea behind that method is that all phenomena under research are analysed as they develop and change in the course of time, which helps the present day process of arriving at the most effective teaching techniques. A comparative study would involve, for example, the use of teaching expertise in a foreign country as an object of research.

Empirical Methods

Empirical research methods include: first - methods for the study and analysis of experience gained by the various schools, and secondly - the pedagogical experiments. The methods used in the study of school experience are applied to recording and identifying whatever already exists in current use. This knowledge plays a major role in improving geography curricula, in formulating new teaching methods, in extending substantive assistance to teachers.

The following methods are used in the study of school experience: the monitoring of the teaching process, questionnaires distributed among teachers and school students, analysis of the various formal papers issued by the school, interviews, written tests.

Experiments are used to generate new pedagogical ideas. More frequently than not they are used whenever it must be ascertained whether or not the students can cope with a particular part of the school curriculum, whether the new teaching techniques may prove effective. Success of the experiment will depend upon a well-conceived research hypothesis and experimental materials aligned with the premises of the hypothesis (texts for study, assignments for the students, the necessary illustrations). The basic criterion in evaluating the validity and usefulness of new proposals for teaching techniques should be positive changes in the knowledge and skills of the school students, their academic behaviour and attitude towards the instruction process. Therefore, one of the experiment's most important conditions consists in devising tests for the students to assess and measure these changes.

Usually the study of problems related to geography teaching involves several methods rather than one, whose combination is determined by the objectives behind the research effort. We will try to illustrate this by supplying the example of studying the state of the art in methods for teaching geography.

The problem is studied as a component of a larger problem area related to the need to improve methods for geography teaching in the secondary school.

The theoretical support for the research is provided by the didactic classification of teaching techniques, formulated by I. Ya.Lerner and M.N.Skatkin. Under this system-oriented classification teaching methods may vary depending upon the school students' cognitive activity and behaviour. One of such methods consists in letting the students have ready-made information as presented by the teacher, the text-book, maps, numerical tables, etc. Under this method the school students only have to digest and retain the information. Another method is known as the reproduction method. It is designed to help the students learn to apply their knowledge in a familiar simulated environment or following a particular "pattern". These skills may include, for example, an ability to use general and special purpose geographic maps to describe individual components of nature or the entire landscape; an ability to derive from a familiar situation the cause-and-effect relationships that have a bearing upon the distinctive features of geographical objects or phenomena, to compare in a familiar situation various objects and phenomena. Whenever the reproduction method is used the teacher formulates assignments supported by maps, the text-book, photographs and other sources of geographical information, while the students are already familiar with the way in which the assignments must be dealt with. Sometimes, while tackling the assignments the students are guided by a sort of manual, prescribing the order of intellectual and practical operations or by a work plan.

The next method is known as the heuristic method and is designed to gradually draw the school students into the process of performing creative operations. This can be done through problem-oriented or creative tasks that cannot be solved by any of the standard procedures known to the students. However intellectual experimentation by school students proceeds under guidance and supervision of a teacher, who asks additional leading questions thereby nudging the students towards several intermediate solutions, whose sum total represents the solution to the entire problem.

The students' cognitive independence will be at its peak whenever the research technique is used. Just like the previous one, this technique seeks to encourage the students to develop ability for creative operations. However, while in the case of the heuristic method the students only make certain steps towards meeting the challenge of a creative task, in the latter case the students are expected to go their own way in solving the entire problem and to discover the logical sequence of learning for themselves.

The research project dealing with the analysis of the schools' experience was expected to solve the following problems:

1. to find out how frequently particular techniques for geography teaching are used at school.

2. to understand what factors determine the use of particular teaching techniques and the style of the teacher's work (the teacher's seniority, his educational background, his competence in handling teaching techniques, availability of teaching aids, equipment, teacher's guides, etc. at the school).

3. to find out how the teacher himself assesses his own work (his achievements and failures, his opinion as to the students' attitude towards the reproduction and the research methods, as to the quality of the students' knowledge gained through the use of the various teaching techniques etc).

4. to reveal the relationship between the extent to which a certain set of techniques is used at school and internalization and retention of knowledge by the students.

The solution of these problems would call for registering a set of intricate relationships between many pedagogical phenomena and circumstances, which can only be done with the help of mathematical statistics. Therefore the research effort involved specialists in applied mathematics, and the experimental materials were organised in a computer-readable form.

The study covered more than 200 teachers of Grade 7 (a course of physical geography of the USSR) and Grade 9 (a course of economic geography of foreign countries) in Moscow, Leningrad and other urban and rural centres. The lessons were attended by several dozen most experienced geography teachers and instructors from teacher training institutions. To guide them "instructions" were formulated, explaining the need to analyse school experience and supplying the specific examples demonstrating the distinctive features of particular teaching methods used in geography teaching. The "instructions" also contained recommendations related to monitoring and recording the lesson routine. It is recommended that particular attention should be given, among other things, to recoridng the actions of the students and teacher, the way in which assignments and questions are formulated. The following table resulted from an analysis of minutes for each lesson:

TEACHING TECHNIQUES

Circumstances in which teaching methods were used	Teaching Techniques			
	Transfer of ready-made information	Reproduction	Heuristic	Research
1. How many times was the method used and for the study of which components of geographic information?				
a. factual material				
b. theoretical knowledge (theories, ideas, general notions, relationships, regularities)				
c. skills				
2. What sources of information were used in the application of the method and how many times?				
a. rendering of material by teacher.				
b. text-book.				
c. statistics, charts and diagrams.				
d. maps, globe				
e. visual material				
3. How many times was the method used at the lesson?				

The information from this table was expected to solve the first problem.

To answer the second and third questions of the research each teacher whose lesson was monitored and recorded was expected to fill in a questionnaire including, among others, the following questions:

What in your opinion is your strong point in teaching this particular course - your ability to convey ready-made information or your ability to organise the students' independent work?

Are you happy, on the whole, about the quality of your teaching in the light of the present-day teaching techniques and requirements?

What is the main factor hindering continued improvement of your teaching competence: insufficient knowledge of teaching techniques of geography, inadequate teaching aids, too much information assigned for each lesson, shortage of teaching time.

The questionnaire also sought information as to whether the students prefer receiving ready-made information to doing creative independent work. What type of independent work do they tend to favour - independent work in a familiar situation or creative work? etc.

The last problem was solved by relating the results of written tests to the information contained in the table "Teaching Techniques". That could be done because written tests included questions to which answers would call for different levels of information retention.

In a school course of geography one normally distinguishes three levels. At the first level the students reproduce information as it is presented to them by the text-book or the teacher. This level could be reached through the use of the method whereby ready-made information is placed at the disposal of the sudents. The second level is characterized by the application of knowledge and skills in a familiar teaching and learning environment, which, in fact, is tantamount to the application of the reproduction techniques. The third level involves creative application of knowledge and skills in an unfamiliar environment, in other words, it is an ability to make decisions in order to solve problems. This level of knowledge retention can be ensured by the heuristic and research teaching methods. Each of the students was to go through three tests, corresponding to the three levels of knowledge retention respectively. As an example we will quote a task relevant to a course of physical geography of the USSR.

1. Characterise the tectonic structure of the East European Plain (task of Level 1)

2. Use maps to explain what circumstances resulted in the formation of humid sub-tropics in the Kolkhida lowlands and dry sub-tropics in the Kurin lowlands (task of Level 2)

3. What changes result from cutting down of forests and why? (task of Level 3)

To guarantee that monitoring is unbiased for each of the tasks a system of points was developed on the basis of the number of correct semantic elements in the answer.

For example:

QUESTION	POINTS			
	5	4	3	2
	for the number of semantic elements in the answer			
What changes in nature result from the cutting down of trees? a) excessive deforrestation may create ravines as a result of soil erosion b) there are stronger winds c) air humidity decreases as forests are responsible for transpiration d) trees are producers of atmospheric oxygen, fewer trees produce less oxygen e) groundwater table sinks f) rivers become shallow g) spring floods become more intensive due to failure of thinned forests to retain snow h) soil on slopes may begin to slide down i) humus build-up in soil, available heat and moisture undergo changes j) vegetation is modified wildlife is in danger of extinction				

Note: The USSR operates a five-point marking system.

Experimental materials made it possible not only to record the immediate situation, but also, more importantly, to identify factors that determine the degree to which different teaching techniques are used, as well as to arrive at a relationship between the extent of knowledge retention by the students on the one hand and the teacher's work-style on the other. More particularly it was found that teachers who make a more extensive use of explorative research techniques succeeded in having the students do the tasks of level 3 more confidently than teachers found to prefer the transfer of ready-made information and the reproduction method. However, this relationship is not direct, because the achievement of cognitive maturity and independence by school students is regarded as one of the least attainable objectives of the learning process. The research has indicated that training of teachers must emphasize the need to teach them more "research-oriented" instruction techniques. The use of this technique is objectively more difficult for the teacher than just relaying ready-made information to the school students or having them organize their work after a particular pattern. Some of the factors that hamper a wider application of the "research" techniques in geography teaching include excessive textbook material and a time shortage. The use of mathematical statistics resulted in a conclusion that ready availability of different teaching aids including the use of teaching machinery does not necessarily involve a more extensive use of research teaching methods because the teacher still remains the central figure in the teaching process and determines its nature.

The study of school experience made it possible to use a more sound science-supported basis to continue research into the methods for geography teaching. They may include the following problems: teaching the students an ability to solve geographic problems: to put forward and verify hypotheses; searching for ways to problem-orient the teaching materials in the text-books, improving teaching techniques involving teaching equipment etc.

ACTION - RESEARCH METHODS IN GEOGRAPHICAL EDUCATION: THE EXPERIENCE OF FRANCE

Lucille Marbeau

Introduction

The section for human sciences of the Institut National de Recherche Pédagogique (INRP) has undertaken action research using full time primary and secondary school teachers. This kind of research is very different from that undertaken by the statistical branch of the Ministry of Education (MOE) or from the laboratory type research undertaken by certain educational psychologists. This action research initiative by the INRP began in the late 1960s and was in response both to requests from teachers and to suggestions from the MOE. The schools participating in this research were given the special status by the MOE of Experimental Schools (if all subject areas were involved) or of Trial Schools (if only some subject areas were involved). The teachers in these schools were accorded a modicum of free time for preparation and additional resources were made available.

The questions to be answered by this research were:

1. How to develop teaching strategies which were adapted to the present and immediate future educational context?
2. How to prepare courses which not only took account of new aims and objectives but also of scientific progress and the results of research?
3. How to develop innovations, and evaluations which are generally applicable by all teachers given an educational reform (curricula are nationally applicable in France)?
4. How can teachers be prepared to accept the new curricula?

5. How may students be grouped to enable each to make progress at his or her own rate?

Action-Research: Methodology

Programming

Whether the initiative comes from the teachers or from the M.O.E. any action research within the present institutional context involves a programme of events to be followed scrupulously. First the nature of the research, the number of schools involved, the number of people involved, the working hypotheses, the schedule of work to be undertaken, the cost and the evaluation, all these have to be worked out. This programme is then studied by the Council of the INRP, and subsequently by the M.O.E. and the General Inspectorate. The research may be authorised (or not) for a number of years, and appropriate resources made available. The results of the research have to be made available within the time span authorized; only rarely are extensions of time granted.

Conditions favouring action-research in France

The fact that this type of research dates from the years 1968-69 is not fortuitous. It is part of a response to the widespread dissatisfaction with the educational system of France violently expressed in the higher education sector during the student troubles of 1968. There had, of course, been earlier attempts at educational experimentation in the middle 1930s and again in 1945 when the M.O.E. instituted the "Classes Nouvelles". But the 1968 problems resulted in a renewed interest in pedagogical reform and in resources being made available to the INRP then simply known as the INP. These resources were applied to research in the primary, secondary and teacher education sectors of education.

However, this type of research which emphasized the freedom of teachers to experiment, began to lose favour during the institutional reforms which took place between 1977 and 1981 under the Ministry of M. Haby, and were all but terminated. It seems likely nevertheless, that such research must begin again under the INRP

The voluntary and cooperative nature of action-research

The research takes place as a result of cooperative work of teams of volunteer teachers in the experimental or trial schools. Although each teacher remains responsible for the classes of pupils he teaches the nature of the innovations undertaken, the teaching aids used, the observation schedules devised and the evaluation instruments used are all the result of team work. Regular weekly meetings are held by the team to review progress. Once or twice a year national research meetings are held which enable the teams' work to be subjected to a more general critique by colleagues. These meetings last three or four days. Although there exists a national coordinator responsible to the INRP, who also acts as animator, providing ideas, information and editing publications, the decisions taken are always team decisions.

Action-research uses a representative sample of trial schools.

An attempt is made to ensure that the trial schools are representative of the various regions of France and of the balance between the rural and urban population. Further attempts are made to make sure that the pupils are representative of the various socio-economic groups within the French population.

Action research implies a constant interaction between theory and practice.

It is important to stress that there is no dichotomy between university researchers and the classroom, it is the teachers in their schools who undertake the experimental teaching and evaluation. These teachers do not have to begin with any of the theoretical knowledge and expertise possessed by full-time researchers, but they rapidly acquire these during the experiments. The national coordinator and his or her colleagues have the necessary research competence which it is part of their function to pass on to the teachers to enable them to illuminate practice with theory and vice versa.

The teachers need to integrate in their practice the findings of educational theory, the content structures of their subjects and the individual and group psychology of their pupils. Collectively they have to formulate approaches, teaching strategies and content which will enable the implementation certain objectives. On objectives, those taxonomies formulated by Bloom (1956), Mager (1962) and more recently by Landsheere (1975) have been extensively used. However, none of these provide ready made recipes, and the teacher-experimenters need to adapt general taxonomies to their particular discipline and to decide on the level of specificity at which these objectives need to be stated. This involves a continual interaction between theory and classroom practice.

The teachers are also trying to find at which levels the pupils are able to understand and use certain concepts and skills, and which teaching strategies and sequences are best able to produce these results. For example in the context of introductory social science activities for pupils in the age range 6 - 11 years, an attempt may be made to see at what language level, at what operational level, at what level of complexity of relationships, the concepts of production, exchange, movement and environment can be understood and used either in concrete situations or through secondary sources such as printed and graphic teaching aids. This is done using a brunerian view of the spiral curriculum. Since the mental progress of children is a function both of their maturation process and of their experiences in school and outside, the teacher experimenters can proceed by successive approximations using feed-back from the pupils until they have found the appropriate levels for each concept and skill. It is here that action-research and fundamental research are close to another. The results of such research may be fed into the formulation of official national curricula and suggestions for teachers.

The procedures of action-research

The first phase is one of innovation. A national meeting of the volunteer teacher experimenters is held during which the aims and objectives of the research are debated and some consensus arrived at. This is followed by active experimentation in schools by the team which is free to innovate within the bounds agreed for the research. A second national meeting is held to discuss the action taken so far and to further define the bounds of the experiment.

The second phase is one of experimentation. Here the teams of teachers adopt mutually agreed approaches and curricula. However, whilst the objectives are common to all members of the team, teaching strategies and the teaching aids used may differ from one school to another.

The last phase is that of evaluation. Inevitably formative evaluation goes on throughout the experiment, but an attempt is made towards the end of the process to undertake summative evaluation and an evaluation of the action research itself. As the research progresses, so the aims and objectives may be modified, usually becoming more complex as the team's view of the total process is enriched by the experience.

Action-research is a form of teacher development

Whatever may be the aims of the research, the teacher-experimenters are confronted by the many elements in the situation: pupils, content, methods, types of school, parents, pressure groups, public opinion, innovation, experimentation, evaluation, aims, different kinds of objectives, previous knowledge of pupils, and so on. Consequently all action research involves a considerable intellectual investment on the part of teachers. Thus whatever their initial training, teachers acquire new expertise: they become able to use and elaborate matrices of hierarchies of objectives, to structure new learning experiences, to create new evaluation instruments. They need to acquire knowledge of areas of their specialist discipline and education of which they were previously ignorant. This self education and contact with other experimenters is an excellent form of in-service training. It would be useful, given the accepted general need for in-service training to be able to generalize this kind of experimentation.

The impact of action-research on the education system: problems of communication and obstacles

Although such action research seems eminently applicable to the classroom, its results have not led decision making bodies to modify their attitudes to education, neither have they led to a change in the practice or attitude of the majority of teachers.

Some examples of development problems

With respect to geography in the primary school, the decision makers, general inspectors and M.O.E. officials, did take note in 1977 of the results of the action-research undertaken by the INRP, though the new curricula have not used precisely the work schemes and objectives which had been tried out. The "Reform of the Education System", was put into effect between 1977 and

1982. It not only modified the content of education, but it required a change in teaching methods in teaching groups (mixed ability teaching) and in the hours devoted to various subjects. It was therefore necessary for teachers to adopt different procedures.

Geography has an important place in the primary school within the context of the "initiation to the social sciences", i.e. one hour per week out of the two hours allocated to this area. "Initiation to the Social Sciences" has replaced since 1977, the history of France and geography, both of which tended to be heavily factual. The geography section of the "social sciences", curriculum integrates the aims of economic social and civic education. The curriculum is based on the local area which provides an appropriate spatial scale and a known concrete example to start from. An enquiry approach is recommended based on the village, the district, the town, the farm, the shopping centre etc. This is extended by studies of similar phenomena through secondary sources, in France and elsewhere in the world, with a view to revisit and revitalize concepts learnt in a concrete context and to the discovery of new spaces and landscapes the world over.

Primary teachers until the early 1970s had not been trained for this new pedagogy and though changes are occurring each year, in-service education is insufficient to cope with the retraining required. Some teachers are resisting these changes, largely because of lack of information and re-training and even long for the old curricula with their teacher dominated style, especially in history.

The new pedagogy avoids verbal knowledge, excessive content, abstract definitions and favours knowledge constructed by the child. Instead of memorising an arid nomenclature and simplistic definitions (e.g. a plain is a low flat area, a plateau is a high flat area), the pupils are asked to observe phenomena, to solve at an appropriate level concrete problems concerned with rural or uban areas, to comprehend interrelationships between people and their physical environment, between human groups and between society and the environment. The knowledge acquired largely by inductive methods will neither be vague nor non-localized. The concept of a plain can best be learnt by observing the floods that devastate villages, farms and even towns when these are situated near rivers whose discharge is irregular. Similarly the shortages of water for crops grown on a plateau may be seen to be an important problem for farmers; even when the plateau is not high, wells may supply insufficient water for people and animals. Thus high plains may be flooded while low permeable plateaux may suffer from drought. It is these kinds of observations made in the field followed by discussion and comparisons made with photographs and films which enable these two concepts to be soundly apprehended by children of less than 11 years of age.

Thus at the end of five years of primary education, children who have benefited from this kind of teaching will have acquired gradually many concepts, skills, structures in geography, a useful basis on which to develop geographical teaching in the secondary school up to the school leaving age (16 years). They will also have acquired solid examples: the network of large towns in France, agricultural and industrial regions, road and rail networks, the main rivers of France, all placed within the main physical features of the county. On a larger scale they will have acquired knowledge of examples across the globe. They will also have developed the capacity to wonder, to observe, to question, to note, to transfer, to represent, to communicate and so on.

In secondary education, geography (which is compulsory up to the baccalaureate level) has also been reformed. During the first cycle (1st four years of secondary education) the traditional geography of continents based on such headings as structure, relief, climate, vegetation, soils, hydrology, population etc, and followed by a study of individual states, has been replaced by a curriculum based on objectives, leaving the teacher a large measure of choice as to what content to include. The study of individual states (except for France, the USSR and the USA in the last year of the first cycle) has been played down in favour of case studies with a view to stimulating a problem or enquiry based approach, inspired by the action-research already undertaken.

Opposition to this approach exists. Some teachers have, in the first year of the secondary school continued to teach general geography with an emphasis on climatic determinism, instead of studying four or five cases of human societies living in ecological interdependence in large areas, such as the Savannah of Africa.

Another example is that of the third year of the first cycle, when Europe after a general introduction, is examined through four themes in which it is possible to investigate the differences in the spatial organization of this diverse continent. These investigations may be based on such examples as: the Ruhr, an industrial region based on a main transport route; the Plain of Lomdardy or the Hungarian plain as an agricultural region; tourism in the Mediterranean area or in the Alps; etc. These enable the students to discover new landscape, study new problems, contrast north and south and capitalist and socialist Europe. France is not as such given special treatment but considered as part of the totality of Europe.

In spite of this freedom to devise interesting and relevant courses, many teachers are critical of the present curricula. This may be put down to the lack of in-service education for such secondary school teachers.

In-Service Education and the Inception of New Action Research

In 1982 24 Commissions for the Continuing Education of Teachers were set up. These were chaired by university teachers and consisted of all those involved in teacher-education: College of education teachers (for primary teachers), directors of Institutes of Education (for secondary school teachers), warden of pedagogical centres, university teachers, school inspectors and advisory teachers. It is in consort with these bodies that a new action-research programme began in September 1983. It is called "Continuing teacher education through research". Its procedures will be vital to its success.

This new action-research was preceded by a pilot project for teachers of the human sciences. Various models of such teacher education were created, tried out and evaluated. Various documents, instruments and strategies proposed. Several questions were posed during this pilot project. Will enough teachers be involved? Will the diffusion and renovation process be sufficiently rapid? Given these questions, work has proceeded with a new methodology. This has been to put in a research type situation small teams of teachers and teacher-educators, giving them a large measure of autonomy and setting them a precise research problem to cope with. For 1983-84 several groups have been constituted with the tasks of developing a regional game; a means of opening the school to the local environment; curriculum schemes based on educational objectives; the reformulation of history and geography curricula to yield an educationally more worthwhile approach.

As in previous action-research the INRP will play an important role by arranging meetings at which experiences of various teams will be compared and decisions taken, by publishing documents and newsletters, by injecting the help of responsible research workers.

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RESEARCH METHODS IN
GEOGRAPHICAL EDUCATION IN JAPAN

Eitaro Asakura

Geographical education is an area of study in which the separate disciplines of geography and education overlap. Up till now, rather than being regarded as an independent entity, geographical education has been viewed as one branch of study within the field of geography or education. Since the 1960's, attempts have been made to establish geographical education as an independent study however, these attempts have not yet been successful.

There are five research methods found in geographical education. They are:

1. Theoretical methods
2. Historical methods
3. Investigative methods
4. Experimental methods
5. Comparative methods

These five methods complement one another. In the following discussion I will outline the main characteristics of the aforementioned methods and summarize the major findings of each in Japan.

1. Theoretical methods

The attempt to answer the question, "What is geographical education" in the main focus of theoretical methods. Before this question can be answered however, we must first ask, "What is geography?". If we examine the contexts in which the words "geography" and "geographical" are used in daily conversation and newspaper and magazine articles in Japan, the words "geographical location", "distribution", "environment", and "region" form the main concept of "geography". (Asakura 1981)

The content of theoretical research is composed of: the objectives of geographical education as well as its content and curricula. Learning process and learning forms in geographical education as well as an evaluation of geographical education itself are also included. In addition, theoretical research also considers, the training received by those who will teach geography and the development of the pupil's geographical consciousness.

Upon examining the curricula of geography as a subject in Japan, it becomes evident that economic geography has been stressed thus far. However, the idea that culturalgeography (stressing people's life styles with regard to their food, clothing, and shelter) should be emphasized in the future is gaining ground.

2. Historical methods

The first sign of Japanese modernization appeared during the Edo Era. In the latter part of this era, by the beginning of the 19th century, terakoya which were private elementary schools established for the purpose of educating the common people had been spread throughout the country. Temples and private homes were used as school buildings and reading, writing, and arithmetic, 3R's, were taught by teachers who were buddhist priests, rônin (masterless samurai) and medical doctors. Teaching materials for the study of geography, that is, the attempt to acquire knowledge about unknown districts, were the textbooks called Ôraimono.

The modern educational system in Japan began with the Law of School System of 1872. And geography was set up as an independent subject from the very beginning.

In the educational reform which took place after World War II in 1947, geography courses were eliminated in elementary, lower secondary and higher secondary school and geography came to be included in the field of social studies.

Historical research has yielded various information on the syllabi of geography courses within the field of social studies, geography textbooks and the approach taken toward geographical education since the Meiji Era.

Historical research is extremely helpful in solving present problems, especially achieving new reforms. (Asabura 1962, Bekki 1953, Nagakawa 1980)

3. Investigative methods

Generally speaking, investigative methods are divided into two categories, descriptive survey and normative survey. (P.A.T. 1982) However, descriptive survey has been more thoroughly researched than normative survey in the field of geographical education.

The evaluation and diagnosis of students' school work in small regions and in individual schools has been widely practiced for a long time. However, it was not until after World War II that research into the actual conditions of scholastic ability on a country-wide scale came into existence.

The Japanese Ministry of Education and National Institute for Education Research have undertaken investigations for scholastic ability on a large scale since 1951 by using the sampling method. Having taken sole control over this research, the Ministry of Education gave nation-wide tests to all second and third year lower secondary school students from the year 1956 through to 1965. These test results formed the basis for the plan for the Course of Studies from 1968 to 1970. At the same time, because test results indicated that the scholastic ability of students in schools in remote areas of the country was low, the budget for promoting education in these areas was increased.

The Course of Studies for elementary school, lower secondary school and higher secondary school was revised from 1977 to 1978, and the revisions were put into effect during the school year of 1980-81. By once again using the sampling method, the Ministry of Education is investigating how these revisions are being implemented and what effects they are having on a country-wide scale.

Many investigative reports regarding the ability of elementary through higher secondary school students to read and draw maps, as well as their knowledge of place names and positive and negative attitudes towards various countries have been published.

4. Experimental methods

Experimental methods are used in researching methods of teaching, learning styles and learning processes of geography. In this type of research, an experimental class and a control class are created. After examining the homogeneity of both groups, different stimuli are given to each class and results evaluated.

Around the year 1955, a great deal of debate occurred on how to increase the reliability of these experimental methods. It was decided that methods of experimental research were to consist of the following consecutive works:

1. establishment of goals
2. choice of an experimental topic
3. formulation of experimental plan
4. presentation of methods
5. practice of experiments
6. treatment and interpretation or results

Today, "design of experiment" from the field of statistics has been introduced and efforts to improve scientific treatment of data in educational experiments are being made.

After World War II, the experiment entitled, "Educational Experiments for International Understanding" (1954-1958) conducted by Japanese National Commission for Unesco became well-known in the area of experimental research. (Japanese National Commission for UNESCO 1960). Among those, in the experimental research aimed at "understanding other countries" England, Pakistan, India, Switzerland, Brazil and the U.S.A. were chosen as subject countries. This report came to be used as concrete reference for promoting not only geographical education, but also experimental research in schools at large.

Today, experimental research is being done by educational research institites, demonstration schools attached to teacher training colleges and universities, many elementary schools, lower secondary schools and higher secondary schools. Research on the subject of geography and the accumulation of basic materials for the future revision of the Course of Studies is taking place.

5. Comparative methods

Comparative research in education begins with analysing the similarities and differences of various phenomena in education. This is done by comparing the education found in different countries, regions and schools. This method also investigates the causes of these differences and aims at discovering the existence of a common principle.

For many years, various studies on geographical education in England, the U.S.A., France, West Germany, and the U.S.S.R. have been done in Japan. Recently, research on geographical education in China, Korea, Thailand, India and Indonesia has also been done.

After World War II, the social studies education in the U.S.A. had a great influence on the subject of geography in social studies in Japan. However, after the revision of the Course of Studies in 1958, Japan began to establish its own social studies program, making references to good points found in other countries than the U.S.A. as well. The first step was taken when a method of teaching based on "sample studies (case studies)" done in England was introduced to the fourth grade elementary school students for their study of "Some regions of Japan". As its good points gradually came to be recognized, the method of teaching based on "sample studies" was partially adopted for studying the topic of "Food Production in Japan" and "Industrial Production in Japan" for the fifth grade elementary school pupils.

The method of teaching based on "games and simulation" which was adopted by the High School Geography Project (HSGP) in the U.S.A. and by the New Geography in England, has not been used in Japan with exception of a few schools.

In the lower grades of elementary school, the combined instruction of social studies and science has become a subject of discussion, and "Sachunterricht" of West Germany and "Activités D' Éveil" of France have drawn the attention of scholars.

The international Educational Information Center has contributed greatly by examining and correcting inaccurate descriptions of Japan in the geography textbooks of foreign countries. (International Education Information Centre, 1983).

The Japan Textbook Research Center is now doing comparative research on the educational processes found in England, the U.S.A., France, West Germany and the U.S.S.R. and on textbooks of the country's own languages, as well as their social studies, science and foreign languages textbooks. They are also conducting comparative research on the geography textbooks of these five countries.

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